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VOL. 35 - JANVIER - FÉVRIER 1956 NO. 1

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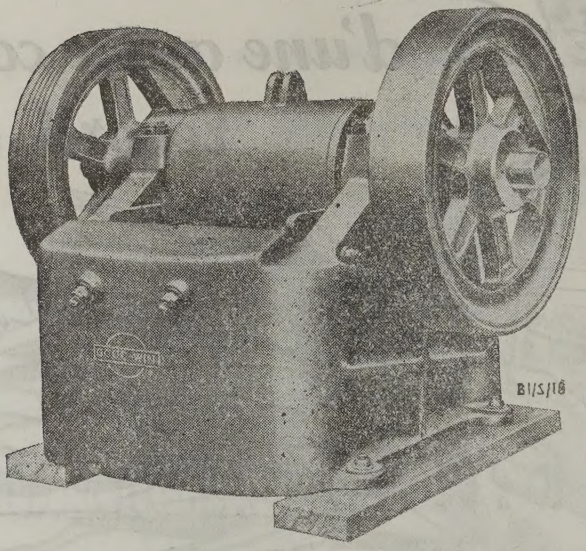

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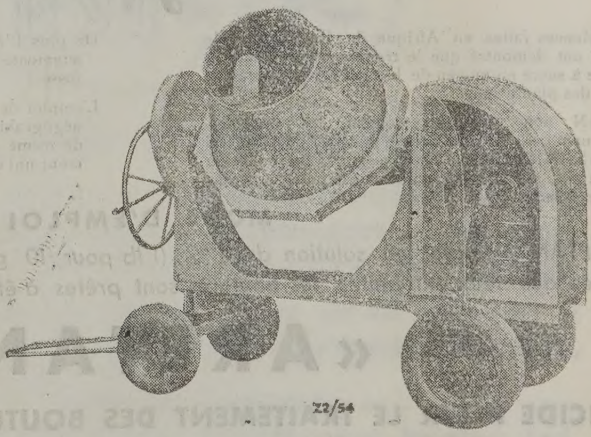

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REVUE AGRICOLE ET SUCRIERE DE L'ILE MAURICE

RÉDACTEUR : G. A. NORTH COOMBES

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1956

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NOTES ET ACTUALITÉS

Conférence internationale sucrière

Le Conseil International Sucrier s'est réuni à Londres du 28 novembre au 1er décembre à la fin d'une année au cours de laquelle on éprouva des difficultés à contrôler le prix du sucre avec efficacité par l'application des réductions maxima des contingents de base des divers pays producteurs. Ces difficultés furent accrues du fait que des pays non-signataires de l'Accord International Sucrier annoncèrent leur intention d'agir sans en tenir compte. Il a donc paru nécessaire de recommander la convocation d'une conférence internationale sucrière en 1956 afin d'apporter les modifications nécessaires à l'accord international et d'assurer la participation de tous les pays intéressés sans exception si possible.

A sa réunion de novembre dernier le Conseil International a pris la décision de réduire de 10 pour cent les exportations sur le marché libre dont les besoins pour l'année en cours avaient été estimés à 4,520,000 tonnes métriques de sucre roux. Il a fixé à 3,996,000 tonnes métriques de sucre roux les contingents d'exportation de base pour 1956.

Le Conseil International s'est réuni de nouveau le 25 janvier 1956.

Accord sucrier du Commonwealth

Les négociations entre les représentants du Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Royaume-Uni et ceux des pays sucriers du Commonwealth pour la fixation du prix du «*negotiated price sugar*» ont été très prolongées. Les pourparlers commencèrent le 6 octobre 1955 mais ce ne fut que le 1er décembre que l'on fut en mesure d'annoncer les termes de l'accord qui se résument comme suit :

1° Un examen minutieux de la méthode de fixation du prix du *sucre négocié* a été fait à la lumière des relevés les plus récents. Cet examen a révélé que la méthode était bonne en principe et son adoption est confirmée.

2° Le prix auquel sera payé le *sucre négocié* en 1956 sera de £40. 15s. 0d. la tonne, c'est-à-dire le même qu'en 1955.

3° La durée de l'Accord du Commonwealth est prolongée d'une année, jusqu'à la fin de 1963.

4° La revision des contingents d'exportation est différée d'une année.

L'Accord du Commonwealth est en vigueur depuis 4 ans, ayant été signé le 21 décembre 1951. Les longues négociations de 1955 constituaient en fait un examen serré des bases mêmes de l'accord et de la façon dont

il a fonctionné. On a eu lieu de part et d'autre de s'en trouver satisfait au point d'inclure les différents contingents d'exportation dans l'Accord International Sucrier Les producteurs de sucre du Commonwealth aussi bien que les consommateurs anglais peuvent se féliciter des résultats du fonctionnement d'un accord qui protège les intérêts des deux parties en permettant aux uns de faire des profits raisonnables tandis que les autres sont assurés d'une denrée essentielle à un prix raisonnable aussi.

Le sucre et la recherche scientifique

Deux articles de haute importance pour les pays sucriers et agricoles, parus respectivement dans *The Australian Sugar Journal* du 15 novembre 1955 et dans *I.S.J.* de janvier 1956 méritent de retenir toute notre attention. Le premier est la reproduction d'une impressionnante causerie faite par le docteur Henry B. Hass, président du *Sugar Research Foundation*, devant le Conseil International Sucrier. Le second, auquel fait allusion le docteur Hass dans sa conférence, est des docteurs R. W Temple et L. F. Wiggins de la division de Chimie et de Technologie Sucrière de l'*Imperial College of Tropical Agriculture* de Trinidad, qui ont mis au point et brêveté un procédé d'ammoniation de la bagasse qui permet son utilisation comme aliment azoté du bétail.

Le docteur Hass parle en faveur de la *Sugar Research Foundation* de création relativement récente par rapport aux organisations analogues de la recherche industrielle. Si d'immenses progrès ont pu être réalisés dans diverses industries cela peut être attribué à la recherche scientifique En ce qu'il s'agit du sucre on l'a trop longtemps considéré seulement comme article alimentaire. A ce point de vue, il est évident que la production dépasse déjà la consommation et il faut avoir recours au contingentement. C'est là un mauvais palliatif. Avec la recherche scientifique on peut trouver de nombreux emplois pour le surplus de production et déjà d'importantes utilisations en dehors du domaine de l'alimentation ont été réalisées avec le sucre. Avec des moyens financiers accrus, de nouveaux débouchés importants s'ouvriront pour le sucre comme matière première industrielle. Ainsi dans l'industrie plastique, la fabrication des détergents, de peintures, d'insecticides, de fibres synthétiques et d'autres produits encore, essentiels à la vie moderne, il semblerait qu'il n'y ait pas de limites à l'utilisation du sucre comme matière de base. A l'heure actuelle c'est le charbon et le pétrole qui sont à l'origine de presque toute l'industrie chimique organique. Ces ressources doivent inévitablement tarir un jour ou l'autre. Il faudra alors se rabattre largement sur le sucre et les substances synthétisées par les plantes, mais il n'y a pas lieu d'attendre l'épuisement des mines de charbon ou des puits de pétrole. Déjà le *Sugar Research Foundation* a réussi la synthèse de détergents en partant du sucre et une grande maison américaine estime pouvoir en mettre sur le marché à un prix moins élevé que les produits correspondants à base d'huile minérale.

La *Sugar Research Foundation* a aussi réalisé une gamme de produits de synthèse avec du sucre et des graisses, chose que l'on pensait pendant longtemps être irréalisable au point de vue économique. On a ainsi obtenu des produits émulseurs et dégraisseurs qui ont d'excellentes propriétés étant incolores, inodores, non-toxiques, sans saveur et digestibles. Ils peuvent servir de points de départ pour des détergents, des pâtes de dentifrice, des additifs du savon et même de substances nutritives que les plantes pourraient absorber par les feuilles après pulvérisation.

Ce qu'il y a de plus remarquable au sujet d'esters sucrés c'est qu'ils demandent seulement 40 % d'huile ou de graisse végétale ou animale et 60% de matière sucrée, alors que le savon exige 63% de graisse. Ainsi à l'échelle mondiale les nouveaux produits auront pour résultat une très grosse économie de matières grasses.

On sait, par ailleurs, que l'on fabrique déjà du nylon en partant de furfurol obtenu de la bagasse. Rien que pour le nylon de la Compagnie Du Pont, la République Dominicaine produit trente millions de livres de furfurol annuellement. A l'Université de Pennsylvanie on étudie l'hydrogénation catalytique du sucre en présence d'ammoniac. Ce projet fut inspiré du fait du coût relativement faible de l'hydrogène et de l'ammoniac comme matières de départ et l'idée que le procédé pourrait donner à meilleur compte des amines qui sont des composés relativement chers. Il a en effet donné 2-méthylpiperazine, une diamine facilement convertie en fibre synthétique. L'on est aussi arrivé à déterminer comment on peut utiliser le sucre dans l'industrie des matières plastiques.

Finalement le docteur Hass a fait allusion aux travaux de la *Sugar Research Foundation* avec le sucre et la mélasse comme aliment pour les animaux de ferme Ces matières ne coûtent pas plus cher à l'heure actuelle que les céréales comme source d'énergie mais elles manquent de protéines. Chez les ruminants cet inconvénient peut être contourné par l'emploi d'azote non-protéique puisque les bactéries du rumen se chargeront de sa conversion. C'est ainsi que l'on emploie couramment à l'heure actuelle l'urée obtenue synthétiquement par interaction d'ammoniac et d'acide carbonique. L'ammoniac cependant sera toujours moins coûteux que l'urée. L'ammoniation directe des aliments d'animaux de ferme présente donc un problème d'intérêt pratique et économique de premier ordre. Un tel procédé a déjà été brêveté par Millar en 1941, mais il n'en est pas résulté grand chose. Dix ans plus tard Stiles brêvetait un procédé d'ammoniation de la mélasse qui malheureusement donne lieu à une certaine toxicité. Wiggins et ses coéquipiers ont identifié la substance toxique et préconisé des méthodes de fabrication qui l'éliminent.

Tout récemment Temple et Wiggins ont trouvé un moyen pratique de réaliser l'ammoniation de la bagasse, en partant du gaz ammoniaque. Bourne l'avait tenté avec une solution aqueuse d'ammoniac, mais son procédé ne se prête pas à la fabrication en grand. Temple et Wiggins ont découvert que l'action du gaz ammoniaque sur la fine bagasse est accom-

pagnée de production de chaleur et de fixation d'azote jusqu'à 2.3%. Le produit résultant est deux fois plus dense que la mœlle de bagasse ordinaire et peut être additionnée de mélasse dans la proportion de 60 parties de bagasse traitée pour 40 parties de mélasse. Il en résulte un produit solide, brun pâle, d'odeur et de saveur agréables, facile à manier et que le bétail trouve fort à son goût.

On ne sait pas encore sous quelle forme l'azote se combine avec la bagasse. Toujours est-il que l'on se trouve en présence d'un produit alimentaire azoté pour le bétail à meilleur marché que celui fabriqué avec l'urée, et qui est très aisément consommé sans effets toxiques apparents.

« Les pays tropicaux » de Pierre Gourou

Publié en premier lieu en France en 1946 le livre de Pierre Gourou, alors professeur au Collège de France, aujourd'hui professeur à l'Université Libre de Bruxelles, a été édité pour la troisième fois en langue française en 1953. Il a déjà été traduit en plusieurs langues. La seconde édition anglaise a paru en 1954. Il n'est pas facile de condenser en un seul volume tout ce qu'il faut dire des pays tropicaux au point de vue agricole et social. Tenter de le faire et réussir de façon magistrale est la mesure de l'érudition du professeur Gourou. Ce livre retient l'attention de la première à la dernière page. Il constitue une thèse irréfutable contre ceux—et ils sont encore nombreux—qui voient dans les régions tropicales une sorte de paradis perdu où la fertilité du sol est incroyablement grande et où la vie est facile et belle L'auteur établit une corrélation habile entre la valeur des sols, la salubrité des lieux et la densité de la population et conclut que les pays tropicaux ne pourront jamais dépasser un certain niveau de vie à cause surtout de l'impossibilité d'augmenter, sinon de maintenir, la fertilité des sols. Il discute successivement tous les aspects de l'agriculture, l'élevage, la nutrition, et les possibilités de développement industriel. La conclusion toujours la même est qu'il faut considérer l'économie tropicale dans son ensemble : ignorer ce principe mène invariablement à d'amères désillusions.

Nous n'avons pas l'intention de donner ici une analyse plus poussée de cet excellent ouvrage. Nous ne faisons que le signaler à l'intention tant des techniciens que des administrateurs des pays tropicaux. L'édition française est publiée par les Presses Universitaires de France, 108, Boulevard St Germain, Paris ; l'édition anglaise est imprimée chez Messrs. Longmans, Green & Co. de Londres, à environ 500 francs et 10/- respectivement.

Nouvelles publications techniques mauriciennes

Deux publications d'un haut intérêt technique et pratique pour l'agriculteur mauricien ont vu le jour en décembre dernier. Il s'agit de *Observations on Sugarcane Diseases in Australia and Fiji* de M.

Robert Antoine, pathologiste à l'Institut de Recherches sur la canne à sucre, et de *The Commoner Insect Pests of Orchards, Food Crops, Vegetables, Flowergardens and Households in Mauritius* de M. André Moutia, entomologiste-adjoint aux Services Agricoles. Les deux publications arrivent au moment opportun.

La première est le fruit d'un voyage d'études fait en juin et juillet derniers en Australie et aux îles Fidji où l'auteur est allé se documenter sur les graves maladies de la canne à sucre, notamment le rabougrissement des repousses et la maladie de Fidji. La première de ces maladies est déjà assez répandue chez nous, la seconde est à notre porte.

Le livret de M. Antoine décrit les conditions sucrières en Australie et à Fidji, fait le point sur les maladies de la canne dans ces pays et sur les moyens de lutte qui y ont été adoptés ; il donne tous les détails sur les deux principales maladies sus-mentionnées et la façon la plus rationnelle selon l'auteur de combattre chez nous de façon efficace la maladie du rabougrissement des repousses. C'est une publication fort bien présentée, facile à lire et dont l'utilité frappera dès les premières pages.

Il en est de même du livre de monsieur Moutia qui est la troisième édition, revue et augmentée, d'un ouvrage paru en 1935. L'auteur tenant compte des grands progrès accomplis depuis la guerre dans le domaine des insecticides, comme dans tant d'autres domaines scientifiques, donne sous chaque espèce les moyens de lutte les plus modernes et les plus efficaces. Cette édition est agrémentée de photographies des principaux insectes nuisibles mentionnés. Elle est déjà en grande demande au prix modique de deux roupies l'exemplaire et peut être obtenue en s'adressant au bibliothécaire du Département de l'Agriculture, Réduit.

Le Kenya augmente ses plantations de thé

Le Gouvernement du Kenya a refusé de proroger l'accord international réduisant l'extension de la culture du thé. On sait que cet accord qui avait été présenté la première fois en 1933 limitait la production mondiale de thé. S'il sauvait les trois principaux pays producteurs alors que l'industrie du thé se débattait dans le marasme d'une surproduction générale, il n'est pas moins vrai qu'il ne nous fit aucun bien. Le Kenya le dénonce aujourd'hui dans le but de permettre l'extension de la culture du thé sur son territoire. En effet, les deux compagnies principales de cette colonie annoncent des plans d'extension. *L'African Highlands Produce Company* qui possède déjà 2200 ha à Kericho va porter ses plantations à 4800 ha au cours des dix prochaines années. D'autre part, la *Kymutet Tea Company*, installée à Kericho également et y possédant 2000 ha, a l'intention d'y ajouter 1200 ha durant la période de 8 années qui va suivre. D'après James Finlay & Company, chargés d'affaires de ces deux entreprises, le marché local est très sain et on espère pouvoir fournir suffisamment de thé pour subvenir à ses besoins, après quoi le surplus sera mis sur les marchés mondiaux. Les deux compagnies précitées doivent construire six nouvelles usines.

En bref

M. P. O. Wiehe, directeur de l'Institut de Recherches sur la canne à sucre en compagnie de madame Wiehe, s'est embarqué à destination du Royaume-Uni le 19 février en congé de détente.

M. René Lincoln, chimiste aux Services Agricoles, a obtenu sa mise à la retraite à compter du 31 décembre dernier. M. Lincoln dont la santé laissait à désirer depuis quelque temps, laisse à ses collègues le souvenir d'un gentleman accompli au commerce le plus agréable.

Le Conseil d'Administration de la *Revue Agricole et Sucrière* offre ses vives félicitations à M. Alfred North Coombes, directeur-adjoint des Services Agricoles et rédacteur-en-chef de la revue, à l'occasion de son élévation par Sa Majesté la Reine à la dignité d'Officier de l'Ordre de l'Empire Britannique (O.B.E.)

Nous signalons l'apparition sur le marché local d'un fertilisant complet qui en sus d'une teneur N. P. K. de 12/12/18 contient du magnésium et les oligoéléments suivants : bore, manganèse, zinc et cobalt. Présenté sous le nom de « Complesal-supra », ce composé est granuleux, peu hygroscopique et facile à épandre à la main ou à la machine. C'est un produit allemand de la Farbwerke Hoecht A. G. de Franckfort; les réceptionnaires sont Messrs. Jackson & Co. Ltd.

THE LATE Mr. G. E. BODKIN, C.B.E.

We regret to announce the death on 23rd December, 1955, at Johannesburg, of Mr. G. E. Bodkin, C. B. E., formerly Director of Agriculture and Registrar of Cooperative Credit Societies in Mauritius.

Gilbert Edwin Bodkin was born in 1886. He was educated at Repton and at Jesus College, Cambridge, where he graduated a B. A. in 1908, proceeding to the Diploma in Agriculture in 1910. He started his agricultural career with a soil survey of Huntingdonshire in 1910-11, joining the Colonial Agricultural Service as Economic Biologist in British Guiana at the end of the same year. In 1912-13 he was elected a Carnegie Scholar in economic entomology, and in 1914 represented British Guiana at the Third Congress of Tropical Agriculture held in London, and also at the Imperial Entomological Conference in 1920. Two years later he was promoted to Palestine as Government Entomologist and there played an outstanding part in the fight against locusts. In 1932, he was appointed Director of Agriculture, Mauritius, a post which he held until his retirement in 1948, when he was re-employed by the Government as Registrar of Cooperation until 1951. From 1932 to 1948, Mr. Bodkin served as an official member of the Colony's Legislative Council.

Gilbert Edwin Bodkin was head of the Department of Agriculture in the lean years before the War and the difficult years of war and just after. He was an excellent administrator, a good organizer and a hard worker, assuming single-handed for many years until the War, the control of his whole department. He had a ready wit and was an accomplished after-dinner speaker. He was a keen angler delighting in casting just where he wanted and catching fish which he carefully put back into the water afterwards. In recognition of his services for Mauritius, Mr Bodkin was created a C.B.E. in 1942.

The passing away of Mr. G. E. Bobkin a few years only after his retirement has come as a surprise to all those who knew him well, and to his widow and daughter we tender the expression of our deepest sympathy in their bereavement.

A. N. C.

THE COMMONWEALTH AGRICULTURAL BUREAUX ORGANISATION

Last June the Fourth Review Conference of the Commonwealth Agricultural Bureaux Organisation was held in London. This Organisation embraces the whole Commonwealth from every part of which representatives had been sent to the Conference, and there were observers also from the United States and F. A. O. Altogether the Conference comprised 52 members and observers, among whom I was privileged to be nominated to form part of the Colonial Territories Delegation.

The importance which the United Kingdom Government attaches to the ***raison d'être*** of the Commonwealth Agricultural Bureaux was clearly brought out by the fact that the Minister of Agriculture, Fisheries and Food in person opened the proceedings. In the course of his speech, the Rt. Hon. Heathcoat Amory said:

> « It has become one of the quinquennial privileges of the Minister of Agriculture in this country to be invited to open the review conferences of the Commonwealth Agricultural Bureaux ... I am a tremendous believer in meetings of this kind of friends and colleagues from the various parts of the Commonwealth. The better we know one another personally the more effective and fruitful our work will be and the more enjoyable too. The Commonwealth is quite a unique organism which is changing and growing all the time. I am convinced that the links that are going to hold it together whatever changes lie ahead will prove to be human personal links — friendly and intimate associations and the feeling that we have more things in common with one another than we have with other friendly nations. So the more we can be together and work together the better it will be ..... You are now meeting together to exchange ideas, to review the progress of the last five years, and to make plans for the future ..... Your organisation is providing an essential service for research workers and through them to the farmers not only in the Commonwealth but throughout the world. *I believe that there is no other organisation providing a similar service on anything like the scale of your own .....* »

Although the Commonwealth Agricultural Bureaux Organisation came into being just over 25 years ago and is now well known to a large number of agricultural institutions and research workers throughout the world, the fullest advantage is not yet being taken of the work it does. It may not be out of place, therefore, to trace the origin of the Organisation and its development and to describe the work it does, in the hope that greater use may be made in the future of the facilities it offers not only to officers of state agricultural departments and colleges but also to individual workers engaged upon matters related to agriculture taken in the widest sense of the word.

Research workers nowadays are faced *inter alia*, with two major difficulties in almost every branch of agricultural science : (a) the need to be in touch with the progress of parallel or related research in their several branches throughout the world, (b) the difficulty of doing this which arises from the great and daily increasing output of scientific literature and the diversity of languages in which it is published.

Already in 1927 the Imperial Agricultural Research Conference had stressed these difficulties and recommended to the Governments of the British Commonwealth the establishment on joint cooperative basis of eight bureaux to collect, collate, digest and disseminate information on research in eight major branches of applied agriculture, and generally to assist research workers in the Empire with information relevant to their lines of investigation. These recommendations were accepted with the result that in 1929 — 30, eight agricultural bureaux began work under the general direction of *ad hoc* Executive Council.

These bureaux are designated as follows : —

1. Agricultural Parasitology (Helminthology) situated at St. Albans.
2. Animal Breeding and Genetics situated at Edinburgh.
3. Animal Health situated at Weybridge.
4. Animal Nutrition situated at Aberdeen.
5. Horticulture and Plantation Crops situated at East Malling.
6. Pastures and Field Crops situated at Hurley.
7. Plant Breeding and Genetics situated at Cambridge.
8. Soil Science situated at Rothamsted.

In 1948 the title of the organisation — to keep in step with modern developments and more accurately to represent the free association of the participating governments — was changed to that of « Commonwealth Agricultural Bureaux ».

The administration of the bureaux remained in the hands of an Executive Council which comprises one member from each of the contributing countries, the Colonial Territories being considered as one entity for this purpose (which, incidentally, seems somewhat on the thin side). Each contributing country therefore has one seat on the Executive Council irrespective of the amount of its contribution, a principle which is in accord with the spirit of the status resolution of the Imperial Conference, 1927 : « ***equal in status, in no way subordinate one to the other*** ». The Executive Council is not under the supervision of any one ministry of any one Government but, through its individual members, it is responsible directly and equally to all the governments represented. Nor is the Executive Council, nor are any of the bureaux, in any way under the supervision of the Government of the United Kingdom. It is necessary to stress this point because of the wrong impression existing in some quarters that United Kingdom has a bigger say in matters concerning bureaux administration. This has arisen

from the fact that most of the bureaux are situated for greater convenience in the United Kingdom and because, in consequence, United Kingdom practice is followed generally in regard to the grading and pay of the staff.

As a basic principle to develop a live service, each bureau was located at or attached to a research institute, University or College working in the same scientific field. All bureaux are in the United Kingdom where facilities exist within easy reach and because the United Kingdom is most frequently visited by scientists from all parts of the world and by civil servants on leave from oversea territories.

When the bureaux were being created, two separate organisations closely related in principle to the type of work the bureaux were instituted to perform were already in existence :

(a) the Imperial Bureau of Entomology which had begun life as a modest co-operative venture in 1909 as the Entomological Research Committee (Tropical Africa) and

(b) the Imperial Bureau of Mycology which was started at Kew in 1920 to provide in the sphere of Mycology services parallel to those offered by the Bureau of Entomology.

Both these bureaux have been given the title of Institutes because in addition to abstracting they are also engaged upon identification work.

Following the Ottawa Conference of 1932 the work of several inter-imperial bodies was examined by the Imperial Committee on Economic Consultation and Co-operation (Skelton Committee, 1933). This Committee approved of the bureaux organisation and of its work, and brought the two institutes under the control of the Executive Council. The Skelton Committee also enunciated certain general principles to be observed in regard to the organisation of the various bodies set up for inter-imperial co-operation and consultation, the most significant of which are :—

Constitutional equality of participating governments in the appointment of the authority administering the work ;

Responsibility of the administering authority to all participating governments ;

Provision of adequate finance for a definite period of years ;

Periodical examination of the work and organisation of the bureaux by inter-imperial conferences called for the purpose.

It is in regard more particularly to the last two of these principles which have all been accepted by the various governments concerned, that review conferences are convened every five years. The British Commonwealth Scientific Conference of 1936 made the first periodical examination, recommended the finance necessary until 1941-42 and the addition, among other improvements, of two bureaux : those of Dairy Science and Forestry both of which started work late in 1938.

The Second World War caused a temporary set-back to the expanding activities of the organisation and deferred the second periodical examination until 1946. Because of the long break, a committee was set up in 1942 under the chairmanship of Lord Hankey to review the bureaux activities and to consider what developments would make them of even greater service not only to the British Commonwealth of Nations, but in general, to the United Nations. Its report published in 1943 and known as the "Hankey Report", formed the basis of the second regular periodical examination carried out in 1946 by the Imperial Bureaux Review Conference which met in July of that year.

The recommendations of the 1946 Conference were exhaustive and brought bureaux work and organisation into line with developments made necessary in a world about to emerge from the chaos of war which speeds up certain aspects of scientific work but dams it up until when released the flood is bewildering and overpowering. The 1946 recommendations included the application of the basal scale of contribution to the general bureaux fund to the other four activities of the organisation, viz. the Institute of Entomology, the Mycological Institute, the Institute of Biological Control, and the Potato Collection (since transferred to the Agricultural Research Council); the constitution of the Parasite Service into the Bureau (now Institute of Biological Control with headquarters in Canada; the rejection of the proposal to form a separate Bureau of General Husbandry, because most of the work, except that on field crops, was already being done by existing bureaux; the allocation of most of the work in field crops to the Bureau of Pastures and Forage Crops, the latter to be re-named Bureau of Pastures and Field Crops; the provision of finance for succeeding period of five years. These and many other recommendations were made and accepted by contributing Governments, to prepare the Commonwealth Agricultural Bureaux services to meet the challenge of post-war conditions.

The third periodical examination took place in 1950. This Conference was more concerned with consolidation than with new developments. It stressed the need to continue the services, to benefit from the mutual advantage of co-operation with international bodies, especially in avoiding duplication of work, and to explore the possibilities of associating foreign governments with the work of the Bureaux.

The fourth review conference held last June and July, went thoroughly into all aspects of bureaux work and made many recommendations, the chief of which are :

(a) The further development of co-operation between Foreign Governments and International Bodies and the Institutes and Bureaux in special projects;

(b) The extension of the work of the Institute of Biological Control to meet the needs of countries other than the contributing members of the Organisation, provided that this can be done without detriment to the work undertaken for the contributing countries;

(c) In relation to the proposal for the creation of a Bureau of Agricultural Economics to ask the International Conference of Agricultural Econo-

mists, which was due to meet in Finland in August 1955, to consider the need for the creation of a special abstracting service.

(d) The consideration of the proposal for the creation of a Bureau of Agricultural Engineering should be deferred until the meeting of the next Review Conference but in the meanwhile, a grant should be made to the National Institute of Agricultural Engineering for the purpose of strengthening its abstracting and information services.

(e) Abstracting being the most important part of the work of the bureaux, certain increases in staff should be made to cope with the growing output of agricultural papers in most branches.

(f) A separate unit to disseminate information on weed control should *not* be set up within the Commonwealth Agricultural Bureaux Organisation, but those bureaux concerned with the subject of weed control should cover as much of the literature as possible other than that dealing with the underlying fundamental chemistry;

(g) The provision of finance for the next quinquennial period.

The contribution of Mauritius towards the cost of maintaining bureaux work is Rs 21,334 annually. What does the Colony get in exchange? Is it worth while? These questions are best answered by a brief recapitulation of bureaux activities. The institutes and bureaux act as effective clearing houses of information for scientists and research workers in agriculture and forestry throughout the Commonwealth and, increasingly, throughout the world. To do this they collect information by examining and indexing almost all journals in their subjects in all languages, by scanning other abstract journals, and by keeping in touch with research in progress. The information they thus garner together is distributed by the periodical issue of 15 abstract journals now circulating to the extent of 18,000 copies, and by the issue of a number of monographs on certain selected subjects.

Apart from the printed record, the institutes and bureaux answer a number of individual enquiries, an activity that ranges from supplying a few references to furnishing a bibliography, a basic library list, or a memorandum of digested information. They also supply reprints, photo-reproductions or microfilms of material inaccessible to an enquirer and assist research workers by giving information about research centres, by arranging the exchange of experimental material between workers, by giving information on post-graduate study, on the sources of supply of apparatus and equipment and so on.

The institutes have the important additional duty of identification of specimens each in its own field. The Institute of Entomology situated across the road from the Natural History Museum in South Kensington, utilizes the magnificent collections of the British Museum, the Mycological Institute keeps its own working herbarium which now contains no less than 56,000 specimens. The Institute of Biological Control prepares and maintains a catalogue of the

parasites and predators of the insects of the world. Its principal activity, however, consists in the supply of beneficial insects attacking various pests. This requires field survey collections and sometimes mass breeding away from the Institute which maintains substations in Europe, the West Indies and the United States, with projected extensions in India and East Africa. In addition to the supply of parasite material, the Institute takes complete charge, if necessary, of biological control projects for governments applying for them.

It was through the Commonwealth Institute of Biological Control that the introduction of insect parasites of ***herbe condé*** was effected. Suppression of ***herbe condé*** has fostered the recovery over arid areas of Mauritius Hemp, the restoration of grassland for grazing purposes, and the release of labour for more useful work. The overall benefit to the Island may he put at about 1½ million rupees per annum. Since 1947 the Institute has been active in assisting the Colony in its efforts to secure more efficient control of sugarcane borers, especially the stem-borer, which caused an estimated annual loss of 2 1/2 million rupees.

The Commonwealth Bureaux Organisation is a cooperative venture of the highest scientific significance and the least of its members enjoys the same advantages as the biggest in fields which, alone, it would never be able to command. The Colony has already derived immense benefit from its membership of the Organisation and it is suggested that every sugar estate should subscribe to some of the abstract journals about which the writer would be glad to supply such further information as may be required.

A. NORTH COOMBES

REPORT ON A MISSION TO SOUTH AFRICA IN 1955

by

P. E. BOUVET

Congress of the South African Sugar Technologists' Association

This congress was held from March 28th to April 2nd in Durban. The Mauritius Sugar Industry was represented by Messrs. G. R. Park, R. Bax and P. E. Bouvet. In his opening speech the President, Mr. Dymond referred to the presence of the Mauritius delegates as a very promising sign of closer cooperation between the South African and the Mauritius Sugar Industries. He said that at the South African end they were very eager to see closer ties being established between the sugar industries of the two countries. A luncheon was offered to the Mauritian delegates by the Committee of the S. A. S. T. A. at the Durban Country Club when again various speakers urged for a closer association between the sugar industries of the two countries.

On the whole the standard of the papers read at this Congress was high and in many cases highly instructive. Each paper was followed by a lively general debate in which a large number of the audience invariably took part. The deep interest displayed by the members of the audience contributed in no small measure to the success of this congress and it certainly gave the authors of the papers the most gratifying feeling that their papers were being received with interest.

Expansion of the South African Sugar Industry

The South African Sugar Industry is experiencing an unprecedented boom and it is expected that the present crop will yield close on to 1,000,000 short tons of sugar. It is true that the enormous size of this crop is largely due to the abnormally rainy season; it is nevertheless expected that average crops from now on will be over 800,000 tons, of which about 600,000 tons will be consumed locally.

The Central Board is well aware of the dangers of overproduction and no more increases in cane quotas to individual growers will be permitted as from 1956, until further notice.

Trends in the South African Sugar Factories

The grinding season during recent years has spread over eight to nine months, leaving very little time for major overhauls as compared with Mauri-

tius practice. The mechanical efficiency of all factories is nevertheless high, averaging over 96% over the last three years.

The average crushing time per day for all mills over the last 4 years amounts to 21.1 hours, as compared with an average of 19.1 hours obtained in Mauritius over the same period.

The millers are faced with the problem of handling ever increasing crops and have done a tremendous effort to meet this demand, in spite of the high cost of machinery and man-power.

Cane Preparation and Milling House

The milleability of the South African cane is poor when compared with that of the Mauritius varieties, the cane being tall and of small diameter. The fibre content is very high in most areas, averaging over 16% . A tremendous amount of trash is delivered with the cane which further increases the milling problem.

The cane cutters have in many instances been fitted with longer blades than usual, the length over the blade holders being 16½" as against 10" to 12" as is the practice in Mauritius. The blades are manufactured locally of boiler plates and the cutting edges are hardened. Roller bearings are widely used for the shafts which are usually 7" in diameter.

Searby shredders are very popular and generally installed between the crusher and the first mill. These shredders have become almost indispensable because of the nature of the cane and high grinding rates.

The mills rollers are provided with deep groovings ; crushers — two or three-roller types, often have 3" pitch groovings at 50° whilst the first and second mills are provided with 1½" and the remaining units with 1" grooves. Mæschært grooves are not generally found on back rollers.

Turbine drive for mills is gaining popularity as everywhere else in the world. Those seen by the writer were all British made and quite satisfactory. The high speed vertical engine drive enjoys a certain amount of popularity and very good installations of this type can be seen at Darnall, Tongaat and Umfolozi sugar mills. On the other hand it is doubtful if the electric drive will ever displace the steam engine or turbine drives in South Africa.

The writer is of opinion that in Mauritius old, slow mill engines should gradually be replaced by steam turbines or high-speed steam engines as they become due for replacement. The choice between the steam turbine and the high-speed engine being governed by considerations regarding the thermal balance of the factory.

Boiler House

Watertube boilers have almost completely superseded the multitubular type. In the past the usual practice was to have a number of comparatively small units, usually of the Babcock and Wilcox type, with step-grate furnaces, whereas the modern trend is towards fewer larger units fitted with Murray or Cook furnaces. The spreader-stoker furnace is gaining favour following its success in the United States and the Carribean.

A lot can be said in favour of this type of furnace where pulverised coal-firing methods have been adapted to bagasse burning. Very high efficiencies are attained due to the fact that these furnaces operate on a fraction of the excess air which has to be admitted in orthodox furnaces. Moreover there is no necessity to open the hearths for ash removal, ash being removed by means of a dumping grate within a matter of minutes. The use of this type of boiler is particularly recommended in Mauritius in those cases where there is only one high-pressure boiler which feeds the turbo-alternators. Another interesting aspect of South African practice is the outdoor installation of some boiler units.

The installed heating surface of boilers in regard to milling capacity is far greater than is found in Mauritius. In this connection it is the writer's opinion that it would pay the local sugar mills to modernise their boiler stations whose standard in many cases is far below the general standard of the rest of the factory. The high executives of the industry in South Africa are well aware of the fact that the successful operation of a sugar factory depends to a large extent on an ample, steady supply of steam of good quality.

The use of steam accumulators offers further evidence of the great importance attached to a good thermal balance, the prevalent opinion being that a steam accumulator pays for itself in the long run in spite of its high first cost. There can be no doubt that the accumulator does a wonderful job in providing a very steady flow of process steam while at the same time permitting to make full use of the boilers which can be fired at practically constant rate.

Boiling House

The tendency is to have a few large units fitted each with its own condenser and vacuum pump. The disadvantage offered by the higher cost of such a set up is more than offset by the advantages that can be derived from it, according to leading sugar technologists in South Africa, and for that matter, in most sugar-producing countries.

At Tongaat the writer was very surprised to find a single pan boiler a Mauritian, operating all the pans with the help of two native boys. The only instru nents available were the ordinary gauges and cuitometers. It is true that the chemists keep a very close contact with the pan station. At the time of the visit six out of the eight pans were in operation. The Gillet method of pan seeding is gaining favour. The method consists in introducing a controlled amount of

extremely fine white sugar powder in a suspension of alcohol before the normal striking out concentration is reached. The writer strongly advises the local technologists to investigate this method which it is claimed produces striking results when conducted under close supervision.

Chemical Control

The chemical control of the larger mills at any rate is carried out very thoroughly. The laboratory staff is numerically more important than in Mauritius.

All Maxwell-Boulogne juice scales are checked daily by means of orthodox check scales.

On the whole it is felt that the South African laboratory figures are reliable. A very close check of the figures is held by the Sugar Milling Research Institute and discrepancies are immediately investigated.

Staff

The European staff of a typical South African factory is numerically much more important than that of the average Mauritian factory. The chief engineers (whose functions are somewhat similar to those of factory managers in Mauritius) must hold by law a certificate of the Institute of Certificated Engineers.

The boiler operators (one per shift) must also hold a certificate of competency, which in the writer's opinion, is a highly commendable practice.

The staff of a large mill visited by the writer consisted of :

Mill Manager
Chief Engineer
Assistant Chief Engineer
Chief of Fabrication
Chief Chemist
Chief Electrical Engineer
Assistant Electrical Engineer
One draughtsman

The above mentioned normally work an eight hours shift during day time only. For the actual operation of the mill each shift of 8 hours consists of :

1 Shift Overseer (process)
1 Bench Chemist
1 Electrician
2 Pan Boilers
2 Fitters

The rest of the European staff who normally work a day shift of eight hours consists of :

3	Certificated Electricians
2	Electrician Apprentices
1	Spare Overseer
14	Fitters
5	Apprentice Fitters
5	Welders
1	Plumber
1	Pattern Maker
1	Brick Layer
2	Riggers
2	Carpenters

are also employed :

2	Indian Carpenters
5	Indian Brick Layers.

On the whole the staff is well paid and well housed. On the large estates many amenities are provided for them such as Co-operative stores, recreation halls, tennis courts, squash courts, golf courses, boarding houses, etc.

The writer has been told in several instances by top executives that Mauritians are highly appreciated and have made a name for themselves as dependable, intelligent staff workers. More Mauritians would be welcome when they cared to come.

Anhydrous Alcohol as a component of Motor Fuel

The mixture petrol-anhydrous alcohol is popular in Natal as a motor fuel. Contrarily to the practice in most of the countries producing alcohol and relying on import for their petrol supply, the mixing is not compulsory by law. The fact however that the supply of anhydrous alcohol can hardly meet the demand in Natal alone proves beyond doubt that the motoring public in general prefers the mixed fuel to straight petrol.

By arrangement with the Excise Department the distillers benefit by a rebate of excise duty of 3d per gallon, provided that the mixture contains 50% alcohol and 50% petrol. The mixed fuel, which is known under the trade name " Union-Spirit " is sold freely alongside with straight petrol at most of the filling stations at 1d per gallon cheaper than petrol.

The South African Bureau of Standards has made careful determinations of octane ratings on straight petrol, Union-Spirit and various mixtures of both.

The following is a summary of their findings:

FUEL	METHOD	OCTANE RATINGS
Union-Spirit	Research Motor	100 88
Mixture of: 1 Union with 1 Petrol	Research	91
1 Union with 3 Petrol	Research Motor	87 81
1 Union with 6 Petrol	Research	84
Petrol used for above mixtures	Research Motor	80 76

Union-Spirit can be used straight provided certain adjustments are made to carburettors. The public at large, however, prefers to mix 3 gallons of petrol with 1 gallon of Union-Spirit thus bringing the percentage of alcohol in their motor car fuel to 14% which necessitates no alteration to the carburettor. It will be noted that the Octane Rating of such a mixture is 87 against 80 for straight petrol. Apart from the fact that the mixed fuel possesses more power than straight petrol it is also claimed by its numerous users that fouling of the cylinder heads, piston heads and valve seats occur to a considerably lesser extent than when using straight petrol.

The distillery that the writer had the privilege of visiting is owned by the Natal By-Products Co. Ltd. It is a very modern and efficient concern. The main distillation plant which is quite recent, having been erected in 1948 by Lepage, Urbain & Cie., has a capacity of 7,000 gallons/day. The main products of Natal By-Products are : anhydrous alcohol of high purity (less than 4 grams total impurities per h/litre); rectified spirits, methylated spirits, sulphuric ether of B. P. and commercial grades, dried yeast for cattle food.

The dehydrating process used is that of Melle using Denyol as entraining agent. The fermentation process though very straight-forward is accurately controlled. Fermentation efficiency is 98%.

Research

The South African Sugar Industry spends a considerable amount of money on research. The Milling Institue under the able direction of Dr. K, Douwes-Dekker is a really first class institution. It is adequately staffed and equipped and is already proving its worth to the Natal Sugar Industry. Its running costs amount to £ 16,000 annually. The Agricultural counterpart of the Milling Institute is the Experiment Station of the South African Sugar Association at Mount Edgecombe which includes the Fertilizer Advisory Service. The annual expenses for running this station amount to round about £ 100,000.

Use of Molasses as Cattle Feed

The high nutritional value of a mixture of bagasse and molasses for feeding cattle has been recognised the world over. The preparation of such a feed is rather simple, but it is essential that the moisture content of the bagasse be reduced to 2—3%. This implies therefore the use of rotary driers.

The writer has visited a very good installation at Melville S. E. The product is sold in South Africa under the trade name "Molameal" containing 90% molasses and 10% dry fibre. This feed is becoming increasingly popular and is marketed at a fairly remunerative price.

Charcoal from Bagasse

Though no charcoal is made from bagasse in South Africa, the writer has obtained all the necessary information from Dr. Douwes-Dekker and Mr. Perk of the S. M. R. I. The latter went the great trouble of translating this information from the "Archief voor de Suikindustries in Nederland an Nederlansh Indie, 1st Jaangary, 1940" which contains a complete documentation on the subject. This information is at the disposal of the Chamber of Agriculture whenever it is required

ESSAIS DE CLARIFICATION DE LA CLAIRCE PAR CENTRIFUGATION

par

VIVIAN OLIVIER

Nous avons fait des expériences à l'usine de Beau-Plan au cours de la campagne sucrière de 1953, sur la clarification de la claircе à l'aide d'une centrifuge continue Wesphalia de 10 tonnes de capacité à l'heure à une vitesse de 3,800 tours par minute.

Les résultats de deux séries d'expériences figurent au tableau suivant:

Dates 1953	Tonnes de claircе turbinées à l'heure	Nombre d'analyses	Brix		Pol.		Pureté		Augmentation de pureté après turbinage	Kg de matières restant dans la turbine après 24 heures.
			Avant Turbinage	Après Turbinage	Avant Turbinage	Après Turbinage	Avant Turbinage	Après Turbinage		
27 Nov.	2.5 à 3.0	8	50.5	50.4	43.9	44.0	86.9	87.3	+ 0.4	27.5
30 „	2.5 à 3.0	11	54.7	54.1	47.3	47.3	86.4	87.4	+ 1.0	29.0
3 Dec.	2.5 à 3.0	15	53.3	52.7	44.8	45.0	84.0	85.4	+ 1.4	31.0
4 „	2.5 à 3.0	5	54.8	54.3	46.2	46.3	84.3	85.3	+ 1.0	22.5
8 „	2.5 à 3.0	8	54.3	53.5	44 7	44.5	82.2	83 0	+ 0.8	24.5
10 „	2.5 à 3.0	7	52.7	50.6	4.51	44.0	85.6	87.0	+ 1.4	19.0
		54	53.4	52.6	45.3	45.2	84,9	85.9	+ 1.0	25.7
11 Dec.	9 à 10	8	48.3	47.8	40.8	40.8	84 .4	85,4	+ 1.0	41,5
14 „	9 à 10	8	53.4	51.8	45.8	44.7	85.0	86.3	+ 1.3	43.5
16 „	9 à 10	6	47.7	46.9	41.9	41.7	87.8	88.9	+ 1.1	57.5
18 „	9 à 10	10	51.4	50.1	44.9	44.0	87.3	87.9	+ 0.6	64.5
21 „	9 à 10	8	47.5	47.8	40.3	41.2	84.8	86 2	+ 1.4	49.5
		40	49.7	48.8	42.7	42.4	85.9	86.9	+ 1.0	51.3

Analyse de la matière restant dans la turbine après 24 heures.

Humidité %	52.2
Pol.	35.9
Autres matières sèches	11.9
	100.0

Le débit de la centrifuge a été, pendant la première série d'expériences, de 2 tonnes 5 à 3 tonnes de clairce à l'heure tandis qu'au cours de la seconde série ce chiffre s'est élevé entre 9 et 10 tonnes.

Les échantillons de clairce avant et après centrifugation ont été obtenus au moyen d'un dispositif automatique. L'augmentation moyenne de la pureté après centrifugation a été de 1°.

Nous ferons ressortir que vu la faible capacité de l'appareil à évaporer, le Brix de la clairce au cours des expériences fut au dessous de celui rencontré en pratique courante. Il est évident que cette densité plus faible n'a pu que favoriser la séparation des matières en suspension dans la clairce traitée.

Il est regrettable que la capacité de la turbine n'ait pas permis de centrifuger la totalité de la clairce et de ce fait que nous n'ayons pu déterminer en pratique l'effet de l'élimination des colloïdes sur la fabrication.

Nous regrettons aussi de n'avoir pu faire des essais avec l'égout de la masse-cuite B, les conditions de l'usine ne nous ayant pas permis de diluer ce produit.

THE SIGNIFICANCE OF HORTICULTURE IN THE NETHERLANDS

by

A. NORTH COOMBES

Deputy Director of Agriculture, Department of Agriculture

The Netherlands have a population of 11,000,000 or nearly 800 to the square mile, which, outside Belgium is the highest in Europe. As the country is not highly industrialised it must pursue very intensive forms of farming in order to maintain this population at the high standard of living characteristic of the Dutch people. It is fortunate, therefore, that the Netherlands should be situated in the centre of the most highly industrialised and heavily populated region of Western Europe, a circumstance which has played an important part in the development of Netherlands' horticulture. This economic advantage is strengthened by conditions of soil and climate which are ideal for horticultural production of the highest order. The combination of these three factors is reinforced by the great organising ability of a people who have realised that security and success could be attained by dependence not so much on their government, which serves them well, but on cooperation, i.e. on themselves.

Holland proper, which comprises the two western provinces of the Netherlands, lies mostly below sea level. Its peaty soil is often very suitable for horticulture. It is the region bathed by the waters of the rivers Rhine, Meuse and Waal which have covered it with a wide, fertile strip of river clay. On the contrary, with a few exceptions, the greater part of the Central, Southern and Eastern Netherlands is covered by sandy soils which are of little horticultural value.

The distribution of land for horticultural purposes is :

Holdings (acres)	0.02 — 7.5	7.25 — 25	over 25
Number of growers	32.000	6,250	694

The area under glass covers nearly 9,000 acres a factor of much importance in an industry producing so intensely.

Horticulture occupies about 6 per cent of the cultivated area of the country. By this standard, the industry seems small in comparison with arable farming which covers 39% and grassland farming which covers 55% . In terms

of value of output, horticultural produce represents 14%, arable produce 31% and animal produce 55% of the total farming produce of the country. But the real significance of horticulture to the Netherlands is best shown by a comparison of the percentage exports of each group of produce :—

	Area in relation to total area cultivated %	Value of total farming output %	Value exported of total farming output %
Horticulture	6	14	20.0
Arable farming	39	31	22.2
Animal farming	55	55	57.8

The economic importance of horticulture to the Netherlands is even better shown by the fact that the total exports of horticultural produce represent over 75 per cent of the total horticultural output.

* * * *

The development of market gardening started in the Netherlands in the 17th century which was the Golden Age of Dutch expansion. In those days of rich merchants, each vied with the other in creating lovely gardens around palatial houses, a few of which, now put to other purposes, are still to be seen to-day. The great skill of the gardeners of those days has contributed to the development of commercial ornamental plant growing as practised to-day. But in those days and until 1850 or thereabouts, the culture of vegetables, flowers and fruits was very much a quiet private matter, except near the towns around which the production of vegetables had gradually become commercialized, so as to meet the needs of their growing populations. Then there came the great development of industry in Britain and Western Germany, which created an increased demand for horticultural products. This demand could be met more economically in the Netherlands owing to its natural advantages and, as these developments coincided with an era of international free trade lasting from about 1850 to just after the first World War, the growth of horticulture made rapid progress. The rate of progress gained in acceleration after the First World War.

The largest customers in the twenties (Germany, Britain, France, Switzerland, the United States of America, Belgium and the Scandinavian Countries) demanded, at an ever increasing rate, fine and early produce, which resulted in specialization and the rapid expansion of horticulture under glass.

This uninterrupted development was suddenly halted in the thirties when owing to world depression the country's best customers introduced political-commercial and monetary measures which adversely affected Dutch exports and led to the restriction of the areas under certain crops, the fixing of minimum prices and the need for relief. The restriction in outlets proceeded

until 1940 when the Germans invaded the Netherlands and it became necessary to substitute maximum for minimum prices. To meet the need for food the area under vegetables and fruit was rigidly expanded. After the War, the Netherlands was faced with the difficult task of re-establishing its former position in the world market — a necessity made the more urgent owing to the greater pressure at home after the loss of the country's oversea possessions.

THE BRANCHES OF DUTCH HORTICULTURE

Dutch horticulture can be classified into eight branches: vegetables, fruit, flower-bulbs, flowers, trees, horticultural seeds, herbs and tobacco.

Vegetables — Vegetable growing covers an area of 120,000 acres half of which carry at least two crops a year. In value, vegetables represent about 50% of all the horticultural produce or something like 27 million pounds sterling. The area has increased only by some 6-7,000 acres over the pre-war acreage but this figure does not really represent the full extent of expansion of the industry of which the chief feature since the war is the intensification of production methods. By ingenious methods of cultivation and the use of glass, it is possible to grow and harvest as many as six different products in succession on one patch of land during one year. Vegetable-growing under glass now covers nearly 9,000 acres, half of which is to be found in the South Holland Glass district where, as far as the eye can see, there stretches glass and nothing but glass. This district is equally famous for its fruit grown under glass, while in spring, vegetables are usually undercropped in fruit plantations. The chief products here are tomatoes, cucumbers, lettuce, cauliflowers, carrots, melons, spinach, grapes, peaches and plums.

Inland from the glass district one comes across the black peaty area known as *The Fens,* growing mostly peas, beans and strawberries. Further north vegetable growing is restricted to three districts together comprising some 23,000 acres of outdoor vegetables, with strawberries, early potatoes and long-keeping cabbage as the main crops. Scattered over the rest of the Netherlands are other centres which have more or less specialized in the production of certain crops such as cucumbers near Groningen and asparagus in the Venlo district. Finally, every large town is adorned with a green belt of vegetables for its own use and this constitutes a pretty feature of Dutch landscape.

Fruit — Fruitgrowing has made more spectacular progress than any other branch of horticulture, increasing from 50,000 acres at the beginning of the century to 170,000 acres. But here also it is not so much increased areas as perfected techniques which are of importance. Thus, yields of fruit have doubled as compared with pre-war, bringing total present production to over 600,000 tons, per annum. The chief fruit is a apple, represented mostly by the *Goudreinette* (Golden russet) variety, followed by pears, cherries and plums.

Among the developments which have advanced the fruit growing industry is the large scale postwar provision of cold storage both by means of cold

storage warehouses and by air-cooled sheds which are now to be seen in all the fruit growing areas. These have made it possible to stagger sales by keeping large quantities of apples for six months or more.

Most of the fruit is exported to Western Germany, Great Britain, Belgium, Luxemburg and the Scandinavian countries.

Flower Bulbs and Flowers — Mention the Netherlands and everyone thinks of 'bulbs'. The Netherlands is of course renowned for its tulips, gladioli, daffodils and hyacinths, but also grows other flowers by the million, and it is a moot point whether one should visit the country in April/May for its bulb-fields or in August/September for its carnations, chrysanthemums and battle of flowers.

The bulb district stretches between Haarlem and Leiden ; at the foot of the dunes which protect it from the North Sea. Bulb-growing covers an area of 20,000 acres of which about half produces tulips and the rest gladioli, daffodils and hyacinths.

Flower-growing, as distinct from bulbs, although scattered among numerous horticultural centres, nestles chiefly around the lovely little town of Aalsmeer. This is very favourably situated for the transport of its products from Schipol, the airport of Amsterdam which is only 6 miles away and from which many flowers are flown to the great cities of Western Europe and America.

Flower growing covers an area of some 3,000 acres. These figures, however, give but a poor idea of this very intensive form of horticulture, until one remembers that quite one third of the area is under glass.

Tree-Growing — At first the production of flowers and of woody nursery stocks was done side by side. Gradually, with the expansion of horticultural exportation, specialization crept in and Boskoop became the main centre of the nursery trade now covering 7.000 acres. The soil around Boskoop is a fertile fen with the water-table 20 inches below ground level, a feature of great advantage in the growth of various plants. The main stocks reared to-day are rhododendrons, azaleas, ornamental shrubs, conifers, rose bushes and other perennials. With the growth of the industry other districts have entered the nursery trade, e.g. Oundenbosch and Zundert for ornamental and forest trees and stocks for hedges ; the provinces of Limburg and Groningen respectively for fruit trees and rose root stocks.

Horticultural Seed Crops — In the Netherlands, horticultural crops for seed are either grown by private seedsmen or by cooperative societies. In the case of selection being carried out by private firms, the seeds are grown on the holdings of the seedmen themselves but the bulk of the pedigree seed is propagated by farmers, or growers on contract, the growers binding themselves to deliver the whole crop to the firm with whom they have contracted. The marketing of the seeds is done by co-operative societies which act as central sales offices.

Before the war a considerable part of Dutch horticultural exports consisted of horticultural seeds. During the war, all foreign markets were virtually lost, but were recaptured for a large part, in the years after 1945, when the area under seed crops rose to 32,000 acres. This was in 1949. The following year the acreage suddenly dropped to 16,000 acres, due to difficulties in marketing, and it is now in the region of 17,500 acres. This form of cultivation depends for its existence entirely on exports.

Herbs and Tobacco — In modern pharmacy there is still a brisk demand for herbs. Before the War this demand was mainly met by the Balkans, but changed political circumstances opened up this old form of cultivation for the Dutch. As for tobacco, it is grown over a decreasing area, only of 400 acres per annum. Flue-cured Virginia varieties are favoured, with some fire-cured Virginia and Kentucky. Curing and marketing are mostly done co-operatively. The average yield is high being about 900 kilos of leaf tobacco per acre.

Vegetable and Fruit Processing — Some 12-15 per cent of the total crop of vegetables and fruit finds its way to the processing industry. This is not a large figure but the canner brings about an even distribution of sales throughout the year, and these purchases exercise a favourable influence upon prices in short periods of glut, both of which benefit these branches of horticulture. There are over 300 vegetables and fruit processing enterprises in the country of which about 100 can process up to 300 tons of vegetables and 80 tons of fruit annually, the remainder being small plants. This means that some 120,000 tons of vegetables and 70,000 tons of fruit are processed annually. Most of the vegetables are sterilized; the fruit is usually turned into pulp or jam.

ORGANISATION

The Dutch have a passion for order and a genius for organisation. It is not surprising therefore to find superb organisation in their horticultural industry. This has paid handsome returns. Good organisation has brought about intensification of endeavour and resulted in greater specialization, better and more efficient marketing, a greater measure of security for the grower and, above all, greater output from decreasing size holdings.

Every Dutch farmer, market gardener or worker belongs to one or more organisations some of which are based on class and creed, others on trades. The former exist mainly for the furtherance of the temporal and spiritual interests of the members in particular and of farmers and growers in general; the latter occupy themselves with particular sections of husbandry from a commercial or professional point of view. Still other organisations are active in the fields of production and marketing.

The organisations based on religion or personal philosophy together with the professional organisations are incorporated in the Federation of Agriculture which comprises the Trade-Unions in which the people employed in horticulture are organized.

The Federation of Agriculture in conjunction with the Ministry of Agriculture, Fisheries and Food, endeavours to raise Dutch agriculture to an ever higher level.

Role of Government — " To rule is to serve " is the unwritten motto of the Netherlands Government in its horticultural policy. The Government serves horticulture in three ways : education, research, information. Progress is based on research and the results of research are passed on to the growers through education and information. *The Government Horticultural Advisory Service* is responsible for both education and information.

Horticultural Education is under the auspices of the Ministry of Agriculture, Fisheries and Food not under the Ministry of Education. The objective is to give anyone engaged in horticulture or desiring to be trained in this occupation, the opportunity to gather the essential knowledge. This objective has virtually been achieved over the whole country, first, in the most elementary form through a general evening course covering two winters, or through attendance at one of the 56 *primary horticultural schools* ; the training thus received can be supplemented later by attending special courses on selected subjects.

A higher class of horticultural training is attainable through the *horticultural schools* of which there are nine, where curricula are focussed upon branches of horticulture of particular importance to the district where the schools have been founded. Two *secondary horticultural schools* provide higher training as comprehensive as possible, one in applied horticulture the other in related economic subjects. Finally, *horticultural vocational or technical schools* hold a place of their own. Tuition at these schools of which there are no less than 68, is strictly *vocational*, i.e. is concerned with definite branches of horticulture, and is meant for people who have already been engaged in horticulture for a number of years and have formerly gone through one of the other general courses. *Advanced horticultural education*, leading to graduate horticulturist, is given at the Agricultural University College at Wageningen.

The total number of students receiving education in horticulture in one form or another amounts at present to some 20,000 per annum.

Horticultural research is much decentralized in the Netherlands. This is the result of wide specialization and the concentration of various crops in well-defined districts, e.g. the famous laboratory for bulb research at Lisse. For the purpose of long term and fundamental research into the fields of improvement, technique, plant diseases, engineering, storage and processing there are five famous institutes all established at Wageningen where the Phytopathological Service is also situated.

Advisory work based on research and demonstrations is co-ordinated with the horticultural education given in the schools. This is carried out under the Government Horticultural Advisers and their staff distributed over 18 stations each of which covers a definite advisory region. The duties of a government horticultural adviser are to give advice to growers on horticultural subjects in

his region, to advise the Government on horticultural matters concerning his region, to supervise horticultural education, to teach, to foster research, and to collaborate in matters of regulations or production as far as they are the concern of the Section of Horticulture.

Export — The bulk of the exports of fresh fruits and vegetables goes to the neighbouring countries, in and outside of Europe, especially to the United States. Destined for consumption outside the country and the fruit of long experience allied to good organisation, the Netherlands horticultural produce is and must be of good quality. The maintenance of a high standard of quality is an essential part of production and is ensured, first, by the growers themselves, by producing only the best for the export market; second and third by Government and the Marketing Boards, which enforce strict control regulations.

Control includes the inspection of produce by the *Phytopathological Service* which tests the health of the products before they leave the country, by the *General Netherlands Inspection Service* which tests trueness to type, variety and purity and quality of seeds, and by the *Export Control Bureau* which examines fruit, vegetables and early potatoes for quality, grading and packing.

Marketing — Control ends rather than begins in the export shed. It starts a long way back, right up to ensuring that only the best and healthiest seed is put into the ground. Conscious of the fact that their efforts on the farms would be ruined if control were released from the time the produce leaves the farms to the time it is sold and exported, the Dutch horticulturists have long realized the great importance of a tight marketing organisation. This is based prominently on the system of selling and buying at auction marts. The auction system has become an essential part of present-day Dutch horticulture and this is true for almost the whole of the production of vegetables, fruit and flowers and, to a limited extent, of flower bulbs. The annual turnover of all the marts now amounts to over £ 40,000,000. The general acceptance throughout the country of this method of selling shows that the method is sound. It also meets many objectives, notably that of serving the interest of the member-growers by fostering the sale of their produce, and that of attracting and keeping the confidence of the buyers. The system is of interest because of its simplicity and adaptability. As the marketing of vegetables in Mauritius has exercised many minds at various times, it is described in some detail.

Produce is either graded and packed by the growers themselves or on their behalf at grading and packing stations equipped for the purpose. It is then brought to the auction mart, usually by the grower himself, and is checked at once by the auction inspector for quality according to adopted standards. If it passes the test it is placed on a trolley and given a number, and it can then take part in the parade in front of the buyers. A little while before the sale begins the order of sale of the trolleys (of which there may be 250 or more) is decided by drawing lots.

The sale is then conducted by means of an electric auction clock operated

by the auctioneer. The buyers, among whom are exporters and wholesale and retail dealers, are seated upon tiers in front of the clock. This consists of a large disk studded with numbers electrically illuminated each corresponding to a buyer's seat. The periphery of the dial carries in clockwise manner numbers from 1 to 100 which correspond to the prices buyers may be prepared to pay for the lots offered for sale. The auctioneer, naming the grower and the quality and quantity of the lot put up for sale, turns the hand of the clock which now starts moving from 100 to 1, i.e, from high to low selling prices. As soon as the hand points to the figure a buyer is willing to pay he presses the push button in front of his seat. The clock hand immediately stops moving and the buyer's number lights up on the dial. This electric system makes it impossible for two buyers to bid simultaneously: one must always be first. It also has the merit of speed — from 400 to 450 sales taking place in one hour — a factor of major importance in dealing with perishable products which mostly have to be exported and delivered the same day.

It was soon found that many problems affecting the grower could not be solved by anyone single society working alone and this has brought about the union of the fruit and vegetable auctions in the Central Bureau of Horticultural Auction Marts, and flower auctions in the Netherlands Floriculturists Association. The tasks of these federations are to promote the interests of the growers, to maintain high quality standards, to advertise and sponsor the exportation of produce and to advise Government delegations negociating trade agreements.

The Federations have been engaged in establishing *minimum price funds* for the benefit of the growers. Periods of abundant supplies, which are not easily or accurately predictable, often create difficulties in marketing because it is then impossible to sell all the produce at remunerative prices. Situations of this kind, which are bound to arise from time to time, may lead to serious slumps in prices to such an extent sometimes that a part of the produce must be sold below production costs. In order to avoid this, the Central Bureau of Horticultural Auction Marts has established minimum prices on the principal that these are not set so high as to affect consumption nor so low as to prevent the stimulation of production. The system works as follows: if the price the buyers are willing to pay is below the fixed minimum, the produce is withdrawn from the market and the growers involved are paid a fixed amount from the prices fund. This is the so-called *compensation price* which represents a certain percentage of the fixed minimum price (the latter varying according to the nature of the produce).

It is obvious that adequate funds must be available to enable such a system to work successfully. These funds are constituted from pre-fixed levies on every sale (25 cents equivalent to Rs. 0.31 per 100 kilos). It is also desirable that the withdrawn produce should be saved, and auction mart societies have been active in building refrigerated stores the main purpose of which is to distribute the supply over a longer period. The total capacity for cooling and storage for the whole of the Netherlands is now about 100,000 tons, of which the auction societies have erected a third.

LA CULTURE DE L'ARACHIDE

par

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L'arachide, plus connue à Maurice sous le nom de pistache, se cultive le mieux à cette période de l'année où les pluies abondantes et les fortes chaleurs lui assurent les conditions climatiques les plus favorables.

Variétés

Nous avons ici trois types de pistache : la pistache filante à deux graines, la demi-filante à trois ou quatre graines, du type Valencia, et la variété arbustive du type *Virginia bunch,* à trois ou quatre graines, ou du type *Natal Common* à deux graines. La première de ces variétés est celle qui était la plus cultivée à Maurice jusqu'à ces 5 ou 6 dernières années.

Sa rusticité mise à part, elle n'a guère de qualité et occupe le terrain pendant 6 mois environ. La variété qui réunit le plus d'avantages est la *Natal Common* connue à Maurice sous le nom de « pistache cabri ». C'est une variété à bon rendement, résistante aux maladies et produisant une amande de qualité excellente tant pour la torréfaction que pour l'extraction de l'huile. Variété arbustive, elle possède le grand avantage de produire une récolte homogène et les fruits réunis à la base des plants s'arrachent plus facilement. La récolte se fait après 4 mois, soit 2 mois plus tôt que la variété filante anciennement cultivée.

Période de plantation

La période la plus propice à la plantation s'étend de novembre à janvier. Dans certaines localités elle peut se faire dès septembre et dans d'autres elle peut s'étendre jusqu'à février ou mars. La culture d'hiver n'est pas très rentable, les rendements atteignant à peine la moitié de ceux que l'on obtient en grande saison. La bonne époque de plantation des arachides correspond à la période de la fin de la campagne sucrière, époque à laquelle de grandes surfaces de terre sont abandonnées pendant 6 mois ou plus, avant d'être replantées en cannes. La culture de ces terres en arachides pendant ces quelques mois serait d'une utilisation économique utile au pays et fournirait de l'emploi à une forte proportion de la main-d'œuvre qui est libérée après la coupe.

Préparation et choix des semences

Nous conseillons très fortement aux planteurs de pistache de sélectionner eux-mêmes les semences et de les conserver pour leurs plantations à venir. Cette pratique présente les avantages suivants :

(i) Les mélanges de semences accidentels ou intentionnels pratiqués par les revendeurs sont évités ;

(ii) le prix de revient de la semence produite par le planteur est dans tous les cas inférieur aux prix forts que réclament toujours les commerçants au moment de la saison de plantation ;

(iii) la qualité des graines sélectionnées par le planteur est toujours supérieure à celle des semences vendues en vrac sur le marché.

Afin d'assurer une germination uniforme et rapide les graines doivent être décortiquées. Cette opération est préférablement faite à la main dans le cas des cultures occupant de petites superficies. Le décortiquage à la machine n'est utile que lorsque la culture doit porter sur de grandes surfaces. L'opération mécanique a souvent le désavantage d'endommager les graines. Celles-ci sont alors rapidement infectées par les champignons ou les bactéries. Il en résulte une proportion élevée de manques dans la plantation Le planteur est toujours tenté de les remplacer, ce qui n'est guère recommandable pour la pistache.

Même au cours du décortiquage à la main les graines sont souvent froissées, le tégument rose qui les renferme étant très fragile. C'est la raison pour laquelle il est bon de traiter à sec les semences avant la plantation au moyen d'une poudre organo-mercurielle dans le but de les protéger contre l'envahissement des champignons et des bactéries lorsque les graines sont restées longtemps en terre à attendre les pluies.

Pour la culture de toutes petites surfaces comme on la pratique dans un potager et où on peut arroser à la main, il n'est pas nécessaire d'avoir recours à ce traitement, mais il est alors désirable d'activer la germination en trempant les graines dans de l'eau pendant 12 à 18 heures avant la plantation.

Le décortiquage à la main offre encore l'avantage de permettre l'élimination des graines impropres à la culture ou des variétés indésirables.

Sols

L'arachide vient bien dans presque tous les sols de Maurice, mais c'est un limon léger qui lui convient le mieux. Des résultats excellents sont aussi obtenus dans les terres graveleuses du nord ainsi que sur les sols lourds et argileux que l'on trouve à la Plaine Lauzun et dans certaines régions de la Rivière Noire.

Les sols calcaires des régions côtières sont les seuls qui ne conviennent vraiment pas à l'arachide. Les plants étant généralement rabougris et souffrent d'une chlorose aiguë occasionnée sans doute par une carence alimentaire provoquée par un excès de calcium.

Préparation du sol

Un bon ameublissement du sol est une des conditions essentielles à cette culture Cette préparation doit se faire immédiatement avant la plantation et de façon à éviter les binages que l'on pratique souvent au cours du développement même de la récolte. La meilleure préparation à donner au terrain est un labour à la charrue à disques suivi d'un hersage. On doit éviter de laisser à la surface du sol des débris végétaux en voie de décomposition. Ceux-ci doivent être réduits et incorporés au sol ou enlevés du terrain: autrement ils y entretiennent la présence d'un champignon occasionnant le flétrissement sclérotique de l'arachide. Lorsque cela est possible il est bon d'étendre la préparation du sol sur une période de plusieurs semaines afin de permettre la germination des graines des mauvaises herbes qui s'y trouvent et d'éviter ainsi la nécessité de sarcler trop souvent après la plantation.

Plantation

Celle-ci, lorsqu'elle est pratiquée à la main nécessite environ 50 à 60 livres de semence décortiquée à l'arpent, soit environ 70 à 80 livres de semence en cosse.

On plante généralement au taux de trois graines par fossé. L'espacement des fossés varie de 12"x12" à 20" x 20" pour les variétés érigées selon la saison et la nature du sol. La dimension des fossés est de 8 pouces de côté par 9 pouces de profondeur. Les semences sont placées aux angles des fossés après que les engrais chimiques aient été déposés au centre et recouverts d'une couche de terre, les semences à leur tour sont légèrement recouvertes de terre. Une couche trop épaisse occasionnerait un retard dans la germination.

Fumure

L'arachide répond généreusement aux apports d'engrais et de façon plus remarquable encore dans les sols de fertilité moyenne ou médiocre. La formule suivante est celle que nous recommandons pour avoir jusqu'ici donné d'excellents résultats:

A la plantation, application faite en profondeur: un mélange de 125 kgs de superphosphate et de 50 kg de sulfate de potasse à l'arpent.

Une dizaine de jours après la germination, application en surface: un mélange de 25 kg de sulfate d'ammoniaque et de 25 kg de nitrate de soude à l'arpent.

La dose relativement faible d'azote provient du fait que l'arachide étant une légumineuse, la plante suffit à ses propres besoins en azote. Cette dose n'est donc que pour favoriser le départ et activer la croissance Avec l'emploi de la formule citée plus haut nous avons pu observer des augmentations de rendements allant de 25 à plus de 100 pour cent.

En règle générale nous ne recommandons pas l'emploi de fumier de ferme pour la raison suivante : l'arachide est une plante très susceptible au flétrissement sclérotique et, comme nous l'avons déjà dit, cette maladie est favorisée par la présence de matière organique en voie de décomposition à la surface du sol. L'emploi de fumier plus ou moins vert et qui ne serait pas bien incorporé et enfoui dans le sol constituerait un élément favorable au développement de la maladie et une menace grave pour la récolte. Dans le cas pourtant où un planteur disposerait d'un bon fumier bien fait qu'il appliquerait en profondeur, l'emploi pourrait se faire sans trop de risques et la dose appropriée serait de 10 tonnes à l'arpent. L'emploi de fertilisants azotés ne serait alors pas nécessaire.

Buttage

La pratique du buttage des plantations d'arachides est souvent exagérée chez nos planteurs. Nous avons eu l'occasion d'observer des buttages où presque toute la plante était recouverte de terre dans le but de favoriser la production des fruits au long des tiges. Cette pratique exagérée n'atteint jamais le but visé et n'est pas recommandable. Il n'est pas nécessaire de butter les plants à plus d'un ou deux pouces et en principe, il suffit seulement d'égaliser les fossés. Le planteur doit savoir que la fleur aussitôt fécondée développe un pédoncule qui descend en s'allongeant rapidement vers le sol afin d'y enfouir la gousse qui va se développer ; on ne gagne rien à intervertir le processus en faisant monter la terre vers la fleur. Ce qui est vraiment nécessaire et nous dirons même essentiel, c'est d'assurer à la plante une terre meuble dans laquelle le fruit pénètrera et se développera librement Cela s'obtient par une bonne préparation du sol avant la plantation et par un ou deux légers binages et sarclages combinés que l'on peut faire jusqu'à la floraison. Aussitôt l'apparition des fleurs, on doit cesser tout travail de la terre. Les sarclages mêmes doivent se faire le moins possible afin de ne pas déranger les gousses en formation.

Récolte

La pistache dite « cabri » dont nous recommandons la culture se récolte au bout de quatre mois environ. Il est très important que la récolte soit faite au moment propice, c'est-à-dire à la maturité des fruits. Une récolte faite trop hâtivement comme on a tendance à faire à Maurice, peut occasionner des pertes considérables de rendements, les gousses étant encore gorgées d'eau. Il faut attendre que les amandes soient bien développées et bien mûries. Un signe certain de la maturité de la récolte est donné par le jaunissement des feuilles suivi de leur chute.

S'il est important de n'arracher les arachides qu'au moment où la récolte est arrivée à maturité, il est aussi important de ne pas trop retarder cette opération. Les gousses mûres pouvant germer sous l'influence des pluies exposent la récolte à une perte considérable si elles restent trop longtemps en terre.

Séchage

La récolte faite, il est impérieux de sécher les amandes le plus rapidement possible. A Maurice le séchage artificiel étant onéreux on a recours au séchage au soleil. Cette opération est souvent lente et laborieuse et constitue un des obstacles les plus importants au développement d'une culture qui autrement aurait pu devenir une industrie très profitable au pays Il y a quelques années nous avons préconisé le séchage en meules bien aérées ou en lignes avec assez de succès pour voir cette dernière méthode, qui est la plus simple, être assez largement adopté. La généralité des planteurs continue pourtant à égréner les pistaches vertes aux champs et à les ramener chez eux pour les faire sécher au soleil les jours suivants. Cette pratique vient notamment du fait qu'on ne peut laisser la récolte aux champs dans la crainte des vols d'autant plus que les fermiers n'habitent pas toujours auprès de leurs champs.

Il est bien important de s'assurer que les arachides ont bien séché avant de les mettre en sacs et en magasin. Au-dessus de 12% d'humidité elles courent le risque de moisir, de fermenter ou de germer. Les arachides bien séchées et non-décortiquées peuvent se conserver parfaitement pendant plus d'un an ; par contre, lorsqu'elles ont été écossées elles rancissent assez rapidement au contact de l'air.

Usage

L'arachide est une plante bien précieuse à l'humanité. Elle est pour l'homme une nourriture excellente étant riche en protéine, en amidon et en huile. Elle constitue une source importante d'huile comestible et les tourteaux que l'on obtient comme sous-produit sont d'une grande valeur alimentaire pour les animaux de ferme. Les feuilles et les tiges obtenues à la récolte fournissent aussi un fourrage de valeur.

L'Ile Maurice gagnerait certainement à cultiver et à consommer plus d'arachide.

NOTES OF RECENT PROGRESS IN THE AGRICULTURAL SCIENCES*

Economic Entomology

The principal advances in economic entomology continue to be in the development and application of synthetic insecticides and in the study of problems arising from their use. Amongst the chlorinated hydrocarbons, newer forms such as the dieldrin and aldrin groups of compounds have been widely tested, and some have shown a high degree of persistence New organophosphorus compounds of high toxicity continue to appear. They are of special interest as systemic insecticides and are being successfully used not only against Aphids but also against Coccids on tropical crops such as coffee and cacao.

In the application of insecticides the trend continues to be towards the use of low-volume sprays, which because of economy in weight are specially suited to distribution from aircraft. Although in the use of insecticides against field crops the tropical less-developed countries, with their predominantly peasant agriculture, remain far behind the temperate regions, particularly North America, important advances of indirect but profound importance to agriculture are being made in the insecticidal control of insects transmitting diseases to man and his stock in Africa. The difficulty of reaching the target in air-to-ground spraying has prompted the use of insecticides in pellet form against such diverse objectives as mosquito larvæ, soil insects and caterpillars attacking maize, and has also led to experiments with aerosol time-bombs, which may be dropped when convenient and liberate the insecticide when it will be most effective.

Resistance to insecticides both amongst certain agricultural pests and particularly amongst insects of medical and veterinary importance continues to cause grave concern. There is little evidence to suggest the acquisition of individual tolerance to gradually increased dosages. Resistant strains are capable of converting toxic to non-toxic compounds, as in the dehydrochlorination of DDT, which now appears to be a result and not a cause of resistance, the precise mechanism of which is still unexplained.

Radioactive isotopes have been used on an increasing scale as tracers in the physiological study of the movement and metabolism of compounds, chiefly insecticides, in insects. They have also been used in studies of population movements and for detecting and tracking insects in concealed habitats such as the soil, within timber and in fruits.

Plant Pathology and Mycology

Plant pathology is coming more and more into its own. The magnitude of the losses caused by fungi, bacteria viruses, soil deficiencies and physiological disorders is at last being more fully recognized, and more and more provision is being made for research in all branches of the subject throughout the world

Following the discovery of systemic insecticides an active search has been maintained for systemic fungicides, and considerable progress has been achieved. It

* Abridged from notes prepared by the Directors of Commonwealth Agricultural Bureaux and published in the 25th Annual Report of the C. A. B, 1953-54, pp. 24—43.

is now known that systemic fungicides do in fact exist, that certain antibiotic products can act in this way, and the question now is to obtain a systemic fungicide that is effective and can be produced at an economic price. The problem of finding satisfactory systemic fungicides appears to be much more difficult than finding systemic insecticides, for the substance active against a plant parasite is likely to be active also against the plant itself. Antibiotics appear to be the most promising group of substances for trial as systemic fungicides, and their use in the control of disease is now being thoroughly investigated, particularly in connection with seedling diseases.

Another development in the control of plant diseases is the establishment of forecasting service. Spray warning services have been in operation in various countries for several years ; for instance, warnings when to spray potatœs against blight (*Phytophthora infestans*) and vines against downy mildew (*Plasmopara viticola*) have been in vogue in Holland and central European countries, respectively for many years, but with the advance of knowledge the technique is now greatly improved and services against other diseases are being devised. Tobacco downy mildew (*Peronospora tabacina*) in the eastern United States is now the subject of an effective spray warning service, and services against apple and pear scab (*Venturia inœqualis* and *V. pirina*) are now common in various countries. As a basis for such spray warning services accurate forecasting of the occurrence of disease is essential, and it is in this field that most progress has been made in recent years.

An important feature of fungicide work concerns the discovery of new materials which are much more potent than the old ones but frequently more limited in use. New compounds of complex organic nature are being brought into use as fungicides, especially in the United States, and much research is being devoted in many countries in the search for suitable products.

An event of major interest in mycological plant pathology is the discovery that sudden death of cloves is due to a fungus, *Valsa eugeniæ*, and not to senescence physiological factors or a virus. It has been confused with a die-back caused by *Cryptosporella eugeniæ*. For more than 30 years the cause of this serious complex escaped detection by foresters, cytologists, virologists and physiologists. It is satisfactory that the true cause has now been determined and sufficient information obtained to formulate an intelligent line of control.

Black rot of cabbage (*Xanthomonas campestris*) causes considerable losses in some parts of the world but dœs not develop under dry conditions. When the crop is grown under irrigation disease free seed can be raised under such conditions, but recently control of the disease has been effected by hot-water treatment.

Of the many advances in virology space permits only two items to be referred to. Use of the electron microscope has revealed the virus particles of the well-known potato virus X to be elongated, thread-like structures. By the immersion of the cut end of a potato cutting in a solution of quanzolo the virus was apparently eliminated, a method, if confirmed, of possibly wider application.

Biological Control

A good deal of attention is now being paid to the effect of insecticide treatments on the natural enemies of insect pests. These investigations, carried on in Great Britain by Massee and his assistants, and in Canada by Pickett Lord and others, as well as by workers in other countries, suggest that insecticidal treatments

conducted for the control of certain pests may actually result in an epidemic of the insect treated or of associated insects because of their detrimental effect on the natural enemies of the pests concerned. Attempts have been made with considerable success to find insecticides and arrange insecticidal treatment that will not interfere with the controlling effect of parasites and predators.

The fact that insecticides are sometimes very injurious to parasitic insects as well as to insect pests, and the discovery that pest populations may develop immunity to insecticides, has suggested the possibility of producing strains of parasites which possess this immunity and will thus be more effective than ordinary strains where insecticidal treatment is necessary. Experiments along these lines carried out at Belleville have shown that the resistance of the Braconid *Macrocentrus* to certain insecticides such as DDT can be very considerably increased by selective breeding. An interesting recent discovery is that distinct morphological differences exist between immune and non-immune strains of the vinegar fly, *Drosophila*. This discovery may have an application in biological control work.

Helminthology

Last year attention was drawn to the pathogenic effect of certain soil-inhabiting nematodes on the roots of plants. It has now been demonstrated that an extensive dermatitis in cattle and dogs is caused by a soil-inhabiting, free-living nematode.

The dispersal of cysts of *Heterodera* by dust storms has been recorded. A new species of *Heterodera* has been found on tea in Ceylon, and another on tobacco in the U.S.A.

Disease due to various nema infections has been recorded for the first time in Holland, Germany, Australia, Brazil. U S A. Nema diseases of various crops, e.g. sugar-cane, sweet corn, banana, pepper, rice, celery, groundnut and citrus, have received considerable attention.

It has been demonstrated that red ring disease of coconuts in the West Indies is spread from tree to tree not by infected plant material but through the agency of the coconut weevil, *Rhynchophorus palmarum*.

Attempts have been made to breed a strain of potato resistant to *Heterodera rostochiensis*.

Animal Breeding and Genetics

A considerable amount of work is being carried out with semen in order to improve artificial insemination technique and increase conception rates. The use of a number of semen diluents has been reported, including whole and skim milk and various proprietary preparations. Milk has been tried in several countries and good results obtained with heated homogenized milk, an increase of 3% in conception rate having recently been reported from the U.S.A.

The technique of long-term storage of semen is, however, still in the experimental stage, and the Milk Marketing Board is experimenting in England with cabinets designed to use solid blocks of dry ice (CO^2).

Adaptation of Livestock to Hot Climates

Research on heat tolerance and adaptation of livestock continues to be of importance, and two interesting points have recently emerged. First, the possibility that the solids-not-fat content of milk is appreciably lowered in " unadapted " cows and secondly, the suggestion made by the Beltsville workers that the ratio of surface area to body weight of the Zebu crossbred is *not* much greater than that of Jerseys. Thus the supposition that the Zebu's greater adaptability to high temperature was due to its extensive dewlap and skinfolds may not in fact be correct. Bonsma's work on the selection of cattle for the semi-arid country in southern Africa shows that smooth coats, thick hides and loose skins are essential in cattle adapted to the environment.

Pigs

The development of new breeds often as a result of crossing imbred lines, is already well known and the American work has been well summarized by W. A. Craft. This work is still in progress and three new breeds, the Beltsville Nos. 1 and 2 and the Maryland No 1, have been described. A Minnesota No. 3 is being developed It is worth noting, however, that the Minnesota No. 1 is considered to be inferior to the Canadian Large White. Canada is also developing a breed of its own from Landrace, Chester White and Berkshire. The Minnesota No. 1 has been imported to South Africa, where it appears to be doing well.

Veterinary Science

The complexities of epidemiology have been well illustrated by the behaviour of myxomatosis, virus disease of rabbits. This disease occurs naturally in South America, where it is a relatively mild disease of the indigenous rabbit (*Sylvilagus braziliensis*). In the European rabbit (*Oryctolagus cuniculus*) it is a very deadly disease with a mortality of well over 90%.

The possibility that the disease could be used as a means of controlling rabbit infestation was recognized many years ago, and trials in cages under laboratory conditions were made in Australia as far back as 1926, and in England in 1934-35. These earlier tests were disappointing as, although the disease was very deadly in rabbits, its infectivity or spreading power seemed to be low Further attempts were made in Australia in 1950, when the disease was introduced into a number of places in New South Wales and Victoria. At some of these places it quickly died out, but in one area in New South Wales it flared up and caused a rapidly-spreading epizootic which destroyed great numbers of rabbits in that State and in Queensland and in Victoria. In 1951, 1952 and 1953 it continued to spread and produced spectacular results over many wide areas.

Whether myxomatosis will prove to be the answer to the rabbit problem of Australia remains to be seen. In 1953 there were reports that a milder strain of the virus had appeared and that more rabbits were recovering than was the case earlier. It may be that rabbits and the virus will become adapted to one another.

In New Zealand determined attempts were made over a period of three years to establish the disease in the rabbit population, but so far without success.

In France the disease was liberated by a private landowner on his farm, and from there it spread rapidly and reached Belgium, Holland, Germany and England.

In France, Belgium and Holland it affected both wild and domestic rabbits, and this is important because the breeding of domesticated rabbits is an industry of some value.

The literature on hyperkeratosis disease in cattle which was first recognized about 10 years ago, has revealed interesting developments.

The poisoning of the cattle has arisen from highly chlorinated naphthalenes contained in lubricants, and wood preservatives.

Cattle housed in wooden barns sprayed with certain wood preservatives or eating food contaminated by them become poisoned, and it is probable that the poison can operate by contact with the skin, by inhalation and by ingestion. Cattle eating forage contaminated with these lubricants contract the disease. Concentrated oil cake produced in the form of pellets have been contaminated by chlorinated naphthalene lubricant in the machinery used for its manufacture Cattle licking spilt motor-vehicle gearbox lubricant containing this chemical have also been poisoned.

Dairy Science

Milking and Mastitis Incidence. The faulty use of milking machines is often quoted as an important cause of mastitis, especially excessive vacuum and leaving the tea-cups on too long Reports from Connecticut, however indicate that these dangers may have been exaggerated and that other factors, such as individual cow susceptibility, laxity of the teat-closing muscle, cowshed hygiene and so on may be more important.

Climate and Milk Production. The vital need to increase the world's food production has made it necessary for cattle not only to exist but to thrive under greater extremes of climate than formerly, and the physiological reactions of cattle to environmental climate have been investigated in Australia, Scotland, South Africa and the United States. A number of reviews on this topic have been written. The optimum temperature for European dairy cattle is about 50° — 60° F. Increasing temperatures cause a decline in milk yield, beginning at the comparatively low temperature of 70° F, but temperatures down to freezing and even beyond have comparatively little effect. One author, therefore, has stated that the simple rule for temperature and ventilation in cowsheds is to "keep cows cold".

Horticulture and Plantation Crops

The year has been noticeable for the number of publications which take stock of past achievement show the present position and pave the way for future effort. Thus a short but important bibliographical compilation from the West Indies offers a guide to important publications on agricultural work in the tropics. Another slim booklet describes the new developments at the Subtropical Horticulture Research Station at Nelspruit, in the Transvaal. A comprehensive work by the Industrial Research Advisory Committee of Hawaii contains a wealth of abstracts on articles dealing with research on tropical crops in the Hawaiian Islands since 1930.

Foliar Nutrition

Interest in the use of nutrient sprays is increasing. Both major and minor elements can be thus applied in varying forms to fruit, vine and vegetable plants, to sugarcane and other crops, often with striking results. Nutrient spraying would seem to be applicable when a quick response and economy of material are desirable.

Workers are still groping towards rules and methods but already among points which would appear to be established are the following: Quicker results are generally attainable than by soil applications, this being particularly noticeable when sprays are applied to remedy the results of minor element deficiencies. Leaf burn may result from too highly concentrated applications, though it would seem possible to obviate this by adding sucrose, at least where urea is the spray used. The effect of nutrient spraying on disease incidence would appear to depend on time of application and stage of growth.

Soil Conditioners

While interest is sustained in soil conditioners, that first pleasant glow of hope that they were the answer to all soil problems has now faded into the more practical knowledge that they may be efficacious, even economical, under particular conditions.

Iron Deficiency Chlorosis. Recent work has shown that iron deficiency chlorosis may be caused not only by high lime, but also by excessive quantities of certain heavy metals, notably copper, in the soil. The use of chelated iron compounds to correct both forms of chlorosis has now been extended to a wide range of crops including citrus and other fruits and various ornamentals. Other chelating compounds beside EDTA (ethylene diamine tetraacetic acid) have also been tried with promising results.

Pastures and Field Crops

A New Approach to the Grass/Legume Pasture in Summer Rainfall Regions of Africa. Over extensive areas of Africa the long dry season precludes the incorporation of perennial clovers in pastures. A promising search for summer-growing annual and perennial legumes adapted to, and capable of surviving, the dry season is being carried out at the Grasslands Research Station, S. Rhodesia. Among summer-growing legumes, *Lespedeza stipulacœ* in combination with rapoka grass (*Eleusine indica*) top-dressed with phosphates shows promise. Others showing promise are *Trifolium masaienes* and *Desmodium tortuosum.* Of the summer-growing perennials, *Glycin javanica, Leucœna glauca, Cajanus indicus* are being tested with various grasses.

Baled Silage in Pits. Farmers in New South Wales have recently conserved fodder in the form of baled silage in pits. The grass or forage crop must be cut in the full-green stage, baled almost immediately and promptly put into the silage pit, where it must be compressed by heavy tractors, preferably of the crawler type, until the interspaces between the bales are filled.

Bird-resistant Maize

It is possible that bird-resistant varieties of maize may be produced in a few years' time as a result of work in Ohio, where early-maturing hybrids with thick, heavy husks are being developed.

A new Oil Crop? A French study of *Lallemantia iberica*, an annual herbaceous species, has shown that this plant may be of value in N. Africa as an oil crop. Its seed yields 30% of oil of the drying type; the residual cake contains 30% protein. *L. iberica* is drought resistant and is not exacting in its soil and cultivation requirements. It can be grown as a catch crop, its vegetative period being 70-90 days.

Couch-grass control with TCA. Most modern herbicides leave this grass untouched. Recent results in England indicate that a satisfactory control of this grass can be obtained by applying 20-40 lb. per acre of a 90% preparation of the sodium salt of TCA, applied in either low (20 gal. per acre) of high (100 gal. per acre) volumes of water. If used non-selectively the 40-lb. rate is preferable. If used as a selective herbicide, 20 lb. per acre can be used with little damage to sugar-beet (about 6 in. high) and linseed, but it will damage peas and beans.

Plant Breeding and Genetics

The continued origin of new physiological races of pathogenic fungi still presents an acute problem to the plant breeder. For instance, collections of potato blight made in Mexico contain races capable of attacking even the resistant wild species native to that country, and potato breeders are seriously considering whether it will not be necessary to make use of some other form of resistance than that provided by the wild Mexican species so far used. Similarly, in stem rust of wheat, using 99 wheat varieties in addition to the standard differentials, 14 biotypes of race 15B of stem rust have been identified at the Federal Rust Laboratory, St. Paul, Minn. Biotypes of race 11 of stem rust of wheat and of race 7 of stem rust of oats have also been distinguished. Probably most races of stem rust of wheat comprise biotypes, but their separation presents a number of difficulties.

The use of hybrid maize continues to expand, and its cultivation in Argentina has raised the yield by 30% - 70%. Its use in 1953 in the 17 European countries participating in the F. A. O programme contributed, according to figures given by F. A. O., nearly half a million tons of grain with a value of approximately 40 million dollars above that which would have been obtained from ordinary open-pollinated varieties.

Soil Science

Soil Conditioners. The Monsanto Chemical Company announced the commercial introduction of the first polyelectrolyte soil conditioner (Krilium) in 1951. Since then many others have been put on the market, considerable experimental work has been carried out with the substances, and it is possible to form idea of likely value in agriculture.

Although prices have fallen somewhat, prices of soil conditioners are still too high for ordinary farm pratice. Results in Britain have generally been negative, one reason suggested for this being that the soils are already in a condition of high structural development. Nevertheless it is now fully established that the addition of small quantities of these polyelectrolytes to soil does impar immediately a state of stable aggregation, improving water-holding capacity and aeration and giving enhanced resistance to erosion. Conditioners are not appreciably attacked by micro-organisms, their effects are fasting and they are non-toxic. In many countries increased crop yields are reported from the use of soil conditioners, but these have not always been as great as might have been expected from the remarkable improvement in the soil's physical state as measured by conventional methods.

DOCUMENTATION TECHNIQUE

A. — *Industrie Sucrière*

THEO. L. MARTIN.—**P.V.C. cables and their application.** (Les conduits en P.V.C. et leurs applications.) *Proceedings of the Queensland Society of Cane Sugar Technologists, 22nd Conference,* pp. 93—98.

Depuis 1945 l'usage de matériaux thermoplastiques, en particulier le P.V.C . comme isolants et cuirasses pour les cables électriques a pris une extension surprenante. Ces cables ont été employés principalement pour la transmission des courants de 250 V et 660 V.

Le P.V.C. comprend 5 constituants principaux dans les proportions suivantes : résine de P.V.C. 60 % , un *plasticiser* 30—33 %, un stabiliseur 5—7 %, un pigment en quantité infime, et un lubrifiant ½—1 % . En changeant le rapport résine à *plasticiser* on varie la flexibilité et la fermeté du câble selon les besoins.

La résine de P.V.C. est fabriquée avec du coke, du sel de cuisine et de la pierre calcaire. Ses propriétés électriques sont excellentes, mais étant trop rigide, il faut y mélanger du *plasticiser* pour lui donner de la flexibilité.

Le *plasticiser* rappelle beaucoup une huile incolore. Il en existe des centaines, dont seulement 5 ou 6 peuvent se mélanger au P.V.C. Un *plasticiser* inapproprié raccourcit la durée du câble. Le stabiliseur est incorporé au P.V.C. pour empêcher une transformation chimique lorsque le câble est exposé à la chaleur ou en plein air. En général le P.V.C. est soumis à une température de 300°F. et une forte pression afin de s'assurer que le composé n'est pas affecté chimiquement avant de le mettre sur le marché.

Le pigment doit être choisi judicieusement car il pourrait affecter dans une forte mesure la résistance d'isolement du câble. Le lubrifiant améliore le fini.

La résistance du P.V.C. au feu consacre son emploi pour l'intérieur des maisons Exposé à une flamme le P.V.C. brûle, mais la combustion cesse aussitôt que la flamme et le câble sont séparés. Par exemple, un échantillon de Nylex de 0.44 soumis à une surcharge eut l'isolant carbonisé sans provoquer d'incendie. Un autre câble enfermé dans un conduit et transmettant du courant de 250 V pendant que la température du couduit était à 242°F révèla lors d'un examen après quatre années de service qu'en dehors d'un léger brunissement le câble était intact. D'autres part, un câble isolé et cuirassé au P V C. supporta une température de—25°F. sans inconvénient. En sus les câbles P.V.C. résistent à une gamme de substances chimiques et ne sont pas affectés par la condensation à l'intérieur des conduits.

Plus petits, plus légers, d'une installation facile et moins coûteuse que les câbles de plomb, ceux de P.V.C. sont mis indifféremment à l'intérieur de conduits en béton, ou enfouis dans le sol. Des sols avec un pH de 12—13 n'ont aucune influence sur le P.V.C. Dans ce cas l'épaisseur de la gaine du câble est de 50%

supérieure à celle des câbles ordinaires. Il est employé avec avantage pour la distribution de l'énergie électrique dans les villes au moyen de réseaux souterrains.

FERNANDO CARDOVEZ.—**(Venezuela's newest sugar factory hacienda El Palmar.)** (Hacienda El Palmar la sucrerie la plus récente du Venezuela.) *Sugar*, Sep. 55, pp. 27—30.

La sucrerie Hacienda El Palmar est située dans la vallée de l'Aragua à 1,700 pieds au-dessus du niveau de la mer. Elle appartient à Don Alberto F. Vollmer et à ses deux fils. La capacité actuellement de 3,600 tonnes par jour sera portée à 7,200. L'usine manipule des cannes de 6,000 hectares. Les cannes arrivent à la sucrerie dans des camions de 6—12 tonnes qui sont pesés sur deux balances Fairbanks Morse de 60 tonnes métriques. Un pont roulant (50 pieds de haut, 50 pieds de portée, 210 pieds de course, 20 tonnes de capacité) et un «portique» (45 pieds de haut, 70 pieds de portée et 30 tonnes de capacité) déchargent et stockent les cannes. Une table d'alimentation latérale et une plateforme à bascule de 40 tonnes alimentent le conducteur principal. Deux coupe-cannes Farrel mûs par des moteurs électriques individuels d'Allis-Chalmers 500 h.p. 600 r. p. m. 4,000 volts assurent la préparation des cannes.

Le tandem comprend 5 moulins de Farrel. Chaque unité est commandé par une turbine de 1,000 c.v., 5,000 r.p.m. recevant de la vapeur à 425 lbs/pouce carré avec une pression à l'échappement de 20 lbs/pouce carré Les cylindres de moulins mesurent 38" x 84", ont des rainures d'un pas 1½", une angularité de 50° et des cannelures Messchaert à l'entrée et à la sortie. Tous les moulins sont équipés d'accumulateurs hydrauliques Edwards. Des embrayages à air Fawick commandent le conducteur principal ainsi que les conducteurs intermédiaires.

Une cuvette unique courre le long de la batterie pour recevoir le jus et une chaîne transporteuse à lattes enlève la folle bagasse qui s'y accumule. Des pompes *chokeless* de Mireless Watson retournent les jus d'imbibition. L'eau d'imbibition est mesurée par un rotamètre de Fisher et Porter tandis qu'un Foxboro *flowmeter* en règle le taux. Enfin un *weightometer* de Merrick and Co. ayant une capacité de 100 tonnes/heure pèse la bagasse.

Deux nouvelles unités seront incluses dans la batterie lorsqu'il faudra atteindre les 7,200 tonnes visées. Par la même occasion un changement dans les engrenages augmentera la vitesse périphérique des rouleaux de 40 à 75 pieds/minute.

La vapeur provient de deux chaudières Riley and Stoker produisant chacune 135,000 lbs/heure. Elles ont une surface de chauffe de 19,300 pieds carrés et comprennent un réchauffeur d'air de 17,200 pieds carrés. Le turbo alternateur de la General Electric débite 3.750 Kw à 4,160 volts et 60 cycles fournissant aussi l'énergie électrique requise. Deux Maxwell-Boulogne de 120 tonnes jus/heure pèsent le jus mélangé. Un Foxboro enregistreur-contrôleur de pH dose le lait de chaux. Deux réchauffeurs, 3,620 pieds carrés et 2.170 pieds carrés respectivement, réchauffent les jus avant le Craver et un autre réchauffeur de

2,170 pieds carrés est intercalé entre le Craver et le Quintuple Effet. La surface de chauffre du Quintuple Effet est répartie comme suit :

1er effet	19,610	pieds	carrés.
2me „	9,030	„	„
3me „	8,200	„	„
4me „	3,230	„	„
5me „	3,230	„	„

La vapeur des appareils à cuire et des réchauffeurs provient du 1er effet Les appareils à cuire au nombre de trois ont une capacité de 1,500 pieds cubes chacun et une surface de chauffe de 3,020 pieds carrés, et sont équipés de condenseurs individuels.

La massecuite A et B est reçue dans trois malaxeurs de 1,500 pieds cubes et 6 malaxeurs de 1,500 pieds cubes munis de serpentins pour le refroidissement servent aux massecuites C. Six centrifuges de Western States de 44" x 30" tournant à 1,200 r.p.m turbinent les massecuites A et B Pour les massecuites C il y a 7 centrifuges 40" x 30" à 1,800 r.p.m. Une Maxwell-Boulogne pèse la mélasse.

La sucrerie comprend aussi une raffinerie conçue par Subar et trois laboratoires dont un est affecté aux analyses des cannes de planteurs, un autre au contrôle de la fabrication et le dernier pour les analyses des eaux de générateurs.

B. D. SOCKHILL — **Laboratory clarification studies with Lytron x 886.** (Une étude en laboratoire de la clarification avec le Lytron x-886.) *Proceedings of the Queensland Society of Cane Sugar Technologists 22nd Conference*, p.p. 259-264.

Les fabricants du Lytron x-886, la Monsanto Chemical Co. définissent le produit comme étant un polyélectrolyte résineux se dissociant dans une solution aqueuse pour libérer des ions négatifs. Cette résine offre l'avantage de promouvoir la formation de flocons qui accélèrent la décantation des boues augmentant de ce fait la capacité des décanteurs.

La procédure suivante fut adoptée pour établir la valeur du Lytron x-886 comme additif dans la clarification des jus provenant de différents sols : Chauler à froid deux litres de jus au pH voulu, porter à ébullution et laisser mijoter pendant deux minutes. Des aliquotes de 500 mls sont alors transférées dans de longs récipients auxquels on ajoute le Lytron en agitant vigoureusement. Placer ensuite les récipients dans un bain d'eau à 90° C et laisser décanter. Les jus sont ensuite examinés et puis classés d'après le volume des boues, la clarté, le temps de décantation, etc. En ajoutant aux jus contenant 200 p.p.m. de P_2O_5 du Lytron au taux de 5-10 p.p.m. le temps de décantation est diminué de 50-75% pour les jus de mai et d'octobre et de 50-60% pour ceux de décembre. De plus la clarté du jus s'améliore considérablement. Le pH optimum est de 7.2-7.4.

Les colloïdes du sol ont trois effets principaux sur le jus, soit : réduction du temps de décantation dans certains cas jusqu'à 60% , diminution de la grosseur des flocons et production d'un jus trouble. Ces résultats ont été constatés

en additionnant à 500 mls de jus 3 grammes de sol avant de chauler. Par contre 4-8 p.p m de Lytron introduit simultanément dans le jus enlève la turbidité causée par les colloïdes du sol. Le pH optimum pour la décantation est 7.5-8.0. Les jus les plus clairs sont obtenus avec un pH au-dessus de 8.0.

Un filtrat très dense provenant d'un filtre rotatif fut traité au Lytron 15 p.p.m., mais sans aucune amélioration dans la clarté Il contenait 3.1-3.4% de solides. En diluant ce même filtrat et en y ajoutant 20 p.p.m. de Lytron la clarté du jus changea radicalement. Par ailleurs, un autre filtrat avec une teneur de 1.62% de solides était transformé par 20 p.p.m. de Lytron.

Le taux de décantation ne subit nullement l'influence du pH entre 7.0-8.0 De même une teneur en P_2O_5 variant de 120-300 p.p.m. avec 0-10 p p.m. de Lytron ne produit pas de changement significatif sur la clarté du jus.

H. A. DITMAR JANSSE Sr.—**Fundamental facts on sugar boiling.** (Principes fondamentaux de la cristallisation du sucre.) *I. S. J.*, 55.11.4058.

Une massecuite convenable ne peut être obtenue lorsque la circulation dans l'appareil à cuire laisse à désirer. Si un appareil à cuire est bien proportionné, l'évaporation pendant la cuisson suffit à maintenir une circulation intense. Donc il n'est pas nécessaire d'équiper les appareils d'agitateurs mécaniques.

Les taux d'évaporation est en fonction de la température de la vapeur. de celle de la massecuite, de la concentration de la liqueur mère environnant les cristaux ainsi que la rapidité de circulation. La transmission de chaleur s'accroit avec une hausse dans la pression de vapeur. Il n'y a pas de différence énorme comme transmission entre des tubes en cuivre ou en fer battu. excepté lorsque ces derniers s'oxident. Dans ce cas le cœfficient de transmission est abaissé de beaucoup. On rencontre le même inconvénient quand la partie en cuivre des tubes en contact avec la vapeur est souillée par un film d'huile provenant de la vapeur non deshuilée.

Une température variant entre 65°—75°C semble la plus propice à la cuite. Cependant avec les dernières massecuites il est préférable de se cantonner aux environs de 65°C.

La tête hydrostatique affecte le taux d'évaporation et la circulation. Il en résulte une surchauffe de la massecuite en contact avec les tubes, la sursaturation est abaissée et une partie du sucre déjà déposé se redissout. Le brix de la clairce et des égouts doit être aux environs de 70°. Avec un brix plus élevé la circulation s'en ressent.

Afin de maintenir une régularité dans la marche des appareils à cuire ces derniers sont équipés de condenseurs individuels. Lorsque la circulation est interrompue ne serait-ce que 5 minutes, il y a le danger d'une formation de conglomérats. Les massecuites à fortes puretés étant les plus vulnérables. Pour que l'alimentation de l'appareil à cuire soit parfaite, il faut qu'elle ait lieu dans le courant de la circulation.

D'autres facteurs affectent assez souvent le cœfficient de transmission sans être inhérents aux appareils, par exemple, un chaulage à outrance qui augmenterait la viscosité de la liqueur mère ayant un brix de 76º—82º. Le retour de non-sucres provenant de massecuites C mal turbinées diminue le taux d'évaporation. La détérioration du jus par les micro-organismes produit le même effet.

B.— *Agronomie Générale*

KAYTAL, S.L.—**Well spaced trees perform well.** (Les arbres bien espacés viennent bien). *Indian Farming*, 1955 **12**, 19-22.

Lorsqu'un endroit propice a été trouvé pour un verger et que le sol a été préparé, l'opération qui suivra sera la plantation des arbres. Celle-ci peut être très simple, mais il ne faut pas oublier qu'elle doit être faite avec soin.La disposition des arbres si elle est livrée au hasard et trop serrée donnera le plus souvent lieu à une jungle Les arbres plantés trop rapprochés ont tendance à "filer" vers la lumière en réduisant leur développement latéral. Un verger, même ordonné, demande d'être créé d'après certaines règles. Quatre principaux dispositifs de plantation se pratiquent généralement : dispositif en carré, en triangle, en quinconce et plantation sur courbes de niveau.

L'espacement entre les arbres varie selon les espèces cultivées. D'autres facteurs tels que la dimension que les arbres doivent atteindre, la fertilité du sol, les possibilités d'irrigation influencent aussi l'espacement à choisir pour une variété donnée. En général les espacements suivants sont adoptés :

Bananiers, papayiers, vignes	8 à 10 pieds
Goyaviers, pêchers, pommiers ...	20 à 25 pieds
Mûriers	25 à 30 pieds
Manguiers (greffés)	30 à 35 pieds
Noisette et figuiers	35 à 40 pieds
Manguiers, letchis (franc de pieds) ...	40 à 50 pieds

Planter dans des trous mesurant 3 pieds de côté par 3 pieds de profondeur. Mélanger du fumier au sol arable en proportion de 1 à 3. Placer le plant de façon que le collet soit légèrement au-dessus du niveau normal du sol afin qu'il reprenne ce niveau lorsque la terre se sera tassée dans le trou. Prendre soin de bien centrer l'arbre et de ne pas lui donner une inclinaison indésirable.

LEMAISTRE, J. — **Dangers du parathion pour l'homme — Moyens de les éviter — Remèdes à l'empoisonnement.** *Fruits d'Outre-Mer*, 1955, **10.** 66-70

Insecticide puissant et très efficace mais très dangereux pour l'homme et les animaux à sang chaud. La dose mortelle est de 2 mg par kg de poids du corps Comme les autres esters phosphoriques le parathion agit sur le système nerveux, étant un inhibiteur de la cholinestérase, enzyme dont dépend le fonctionnement normal du système nerveux. L'empoisonnement peut résulter non seulement de l'absorption d'une forte dose de parathion, mais encore, et comme c'est plus fréquemment le cas au cours du travail aux champs, par l'exposition

prolongée et cumulative du corps à de petites quantités de l'insecticide. Le parathion est absorbé par l'appareil respiratoire et surtout par la peau.

Symptômes de l'empoisonnement. Se classent en trois catégories :

1. Nausée, diarrhée, augmentation de la sécrétion salivaire, larmes, sueur, contraction des pupilles et mauvaise vision, difficulté respiratoire, sensation de resserrement de la poitrine. Symptômes désignés sous le nom de *symptômes muscariniques.*

2. Symptômes dits nicotiniques : contraction des muscles des paupières et de la langue pouvant être suivie de spasmes ; faiblesse générale pouvant empêcher le fonctionnement normal des muscles de la respiration et rendre nécessaire la respiration artificielle.

3. Maux de tête pouvant être accompagnés de vertige et d'une sensation générale de malaise et de nervosité.

Seuls les symptômes muscariniques peuvent être atténués ou supprimés par l'atropine, antidote du parathion. Si l'empoisonnement est grave le coma et la mort peuvent s'ensuivre et cette dernière dans une moyenne de 10 heures suivant la dernière exposition au parathion.

Précautions à prendre : Porter un demi-masque protégeant le nez et la bouche pour empêcher l'inhalation de particules imprégnées de parathion. Un chapeau et un cache-poussière à manches longues sont indispensables pour réduire au minimum l'exposition de la peau. Chaussures et gants de caoutchouc naturel doivent être portés. Le cuir, le caoutchouc synthétique et la toile permettent au parathion de s'accumuler.

Un bain complet après chaque journée de travail est peut-être la plus importante de toutes les précautions à prendre. Se laver soigneusement les mains avant de manger ou de fumer. Manipuler avec soin le produit et les appareils servant à son application. Le matériel doit être lavé après chaque journée de travail On doit interdire l'accès des parcelles traitées pendant au moins quatre jours après le traitement. On ne doit recommencer à y travailler qu'après au moins 8 jours et on ne doit y cueillir des fruits qu'après 15 jours.

Traitement : En cas d'empoisonnement il faut :

Appeler le médecin ; enlever les vêtements souillés par l'insecticide ; nettoyer au savon ou à l'eau bicarbonatée à 5% les parties du corps soumises à l'action du toxique ; renouveler les lavages en rinçant bien chaque fois et sans appuyer pour éviter la pénétration du produit par massage. Les sujets peu atteints peuvent être traités sous surveillance du médecin au sulfate d'atropine par voie buccale administré à la dose de 0.5 mg toutes les heures. Ne pas dépasser 10 à 20 mg par jour. Chez les sujets plus intoxiqués injecter par voie sous-cutanée ou intraveineuse préférablement 0,25 à 0,5 mg de sulfate d'atropine, la dose de 4 mg ou plus par jour peut être atteinte. La respiration artificielle et des inhalations d'oxygène peuvent être nécessaires dans certains

cas de même que l'aspiration bronchique en cas d'encombrement bronchique. Si le malade a avalé du parathion il faut le faire vomir en lui faisant boire de l'eau salée ou savonneuse. L'emploi de la morphine est contre-indiqué.

MOUTIA, A. — **The Commoner Insect Pests of Orchards, Food Crops, Vegetables, Flower Gardens and Households In Mauritius.** (Les insectes s'attaquant communément aux arbres fruitiers, cultures vivrières et les fleurs et ceux souvent rencontrés dans les maisons à Maurice). Bulletin No. 91, *Department of Agriculture — 3rd Edition revised and enlarged Govt. Printer, Port Louis Mauritius, December* 1955.

L'ouvrage est divisé en onze chapitres dont le premier décrit brièvement les insectes et en donne des notes biologiques. Les chapitres II à VIII groupent chacun dans leur ordre naturel les insectes s'attaquant aux végétaux et donnent une description de leurs mœurs ainsi que les moyens de lutte à employer. Le chapitre IX est consacré aux animaux nuisibles tels que les acares, les mollusques, les vers et les rats qui s'attaquent aussi aux cultures et, enfin, le chapitre X décrit les insectes communément trouvés dans les maisons, comme les termites, le cancrelat, la puce, la punaise, ainsi que les moyens de lutte dont on dispose contre eux.

L'ouvrage est suivi d'appendices où le lecteur trouvera une liste des plantes et des insectes les attaquant, une liste des noms scientifiques des insectes et autres animaux nuisibles mentionnés dans le texte ; une liste des noms vernaculaires et scientifiques des plantes citées et finalement une table des mesures couramment employées.

Cet ouvrage est un guide précieux pour tous ceux s'intéressant à la protection des petites cultures et trouve même son application jusque dans la maison.

VILLARDEBO, A. — **La cochenille de l'ananas : Pseudococcus brevipes Ckll. et le Wilt qu'elle provoque.** *Fruits d'Outremer*, 1955, **2**, 59-66.

Le *wilt* de l'ananas ou *Mealy bug wilt* est un flétrissement ou dépérissement du plant qui est la conséquence directe de l'alimentation sur l'ananas d'une cochenille pseudococcine : *Pseudococcus brevipes* Ckll. Le dépérissement de la plante est probablement dû à une phytotoxicité occasionnée par les sécrétions salivaires de l'insecte. Cette explication n'a pas encore été prouvée et n'est qu'une hypothèse. *Les symptômes* :

1er stade : Rougissement des feuilles.

2me stade : Changement de la coloration rouge vers le rose, puis le jaune, en même temps les bords des feuilles s'incurvent, présentant leur concavité vers le bas.

3ème stade : Les feuilles perdent de leur turgescence et se plient.

4ème stade : Les feuilles malades se dessèchent sur la plus grande partie de leur longueur.

Il arrive souvent que lorsque le deuxième ou troisième stade est atteint la plante reprend de la vitalité et si elle est protégée contre de nouvelles attaques de cochenilles, elles continuent leur cycle de développement jusqu'à fructification. Dans le cas d'attaque précoce les fruits peuvent être de forme normale, mais seront en général de taille plus petite et de qualité inférieure. Quand l'attaque est plus tardive les fruits deviennent difformes et n'arrivent pas à maturité. A l'arrachage des plants malades, on observe l'absence presque complète du système radiculaire. La mort des racines est le premier symptôme qui se montre sur la plante wiltée la manifestation du flétrissement des feuilles ne venant que par la suite. Selon les expériences conduites par W. Carter, c'est l'émission de nouvelle racines après l'attaque qui permet à la plante de reprendre sa croissance.

Certaines pratiques culturales, l'époque de plantation et l'âge des plantations sont encore des facteurs qui peuvent influencer le développement de la maladie. Il n'est pas nécessaire que les cochenilles s'établissent en permanence sur un plant pour que le wilt apparaisse. Il suffit que l'insecte s'alimente pendant une période, même assez courte, pour que dans la suite apparaissent les symptômes. La période de susceptibilité la plus grande de cette culture paraît être le début de la saison sèche. — *L'Insecte* : La reproduction de la cochenille occasionnant le wilt est parthénogénétique et vivipatre La reproduction sexuée est possible mais rare chez cette espèce. Les cochenilles ne se découvrent sur la plante atteinte qu'en écartant les feuilles basales de la tige. Elles sont visibles en colonies serrées à la base des feuilles, sur la tige même, et souvent sur la partie souterraine Au moment de la fructification, il y a déplacement des insectes vers le fruit, principalement à sa base. Après la fructification les insectes s'alimentent de préférence au point d'insertion des sujets sur la tige ou sur les rejets eux-mêmes Comme ceux-ci constituent le matériau de plantation on conçoit la facilité avec laquelle s'infestent les nouvelles plantations. L'association fourmi-cochenille s'observe fréquemment dans les plantations d'ananas. Les fourmis se nourrissent du miellat secrété par les cochenilles ; en les véhiculant d'un plant à l'autre elles assurent leur dissémination au sein de la plantation — *Les moyens de lutte* : Le seul insecticide à employer dans la lutte contre la cochenille farineuse est le thiosulfate de diethyl et de paranitrophenyl désigné sous le nom de parathion. Toutes les expériences ont démontré sa très nette supériorité sur les autres insecticides tels que le D. D. T., le H C. H., le chlordane, etc. Le parathion a remplacé très avantageusement les huiles blanches utilisées autrefois dans la lutte contre les Pseudococus. Le parathion est un toxique violent pour l'homme. Il faut le manipuler avec grande précaution et les ouvriers travaillant avec ce produit devront porter des masques. L'application de cet insecticide doit se faire par pulvérisation à la dose de 0,15 à 0,2% de produit actif — environ 40 à 70 c. c de solution seront employés par plant selon l'âge de la plantation. Tous les pulvérisateurs conviennent à cet usage, les appareils à dos sur les toutes petites surfaces. Lorsque celles-ci atteindront 1 ou 2 ha, il sera préférable de se servir d'appareils de 300 à 500 litres de capacité. Le nombre de pulvérisations dépendra de la nature du climat. Aux Iles Hawaï elles se font fréquemment pendant tout le cycle de la culture. En Guinée on en fait seulement 3 ou 4 pendant la période critique seulement. *N. de la R.* Voir plus haut dangers du parathion pour l'homme par J. LEMAISTRE.

WHITE, J. S. L. — **Modified " deep litter " system for poultry** (Modification du " Deep Litter " pour l'élevage des poules). *Tropical Agriculturist*, 1955, **2**, 120-4.

La méthode véritable du *deep litter* dans l'élevage des poules est un système d'élevage intensif dans lequel les oiseaux sont toujours confinés dans un bâtiment bien aéré dont le parquet est couvert d'une matière absorbante telle que de la sciure de bois, de la paille ou des coques de riz sur une profondeur d'environ 30 cm. Cette litière est remuée fréquemment, mais jamais échangée avant environ un an. Le bâtiment où logent les oiseaux est aménagé de façon à prévoir à tous leurs besoins: nourriture, eau, nids, perchoirs. Les élèves doivent y vivre sans autres ressources. Dans ce système d'élevage le facteur alimentation est des plus importants et les rations doivent être établies avec soin afin d'assurer aux oiseaux leurs besoins en protéines, matières hydrocarbonnées, vitamines et minéraux. Dans les pays aux hivers rigoureux cette méthode se trouve être un moyen idéal parce qu'il n'y a pas d'autre possibilité que de garder les oiseaux enfermés; dans les pays tropicaux elle devient aussi très populaire dans les endroits où l'espace est limité. L'auteur a procédé à un essai d'élevage où le *deep litter* est combiné avec le pâturage libre. Pour ce faire, le bâtiment de 12½ x 7 pieds servant à loger les oiseaux s'abouchait à une cour extérieure d'environ 1/8 acre plantée d'herbe et enclose et recouverte de toile métallique. Avant l'introduction des oiseaux la litière fut saupoudrée d'un peu de chaux et cette opération renouvelée environ tous les deux mois au taux d'une livre pour 20 pieds carrés. Voici la formule alimentaire adoptée avec les sujets en expérimentation :

Age des oiseaux	0-8 semaines	9 semaines 4 ½ mois	adultes
Farine de maïs	50%	44%	38%
Poonac	6	15	30
Farine de poisson	22	18	8
Son de riz	20	20	20
Lait écrémé en poudre	2	1	—
Farine d'os stérilisé	—	1½	1½
Coques d'huîtres broyées	—	—	2
Sel	—	½	½

Cette nourriture sous forme sèche ainsi que l'eau de boisson était en permanence à la disposition des oiseaux et les oiseaux avaient accès au pâturage de 9 heures du matin jusqu'à 5 heures de l'après-midi. Les jeunes poules adultes commencèrent la ponte en mai 1954 avec les résultats suivants :

mai 1954	71 poules	444 œufs	novembre	64 poules	1071 œufs
juin	71 „	1346 „	décembre	61 „	964 „
juillet	71 „	1333 „	jan: 1955	61 „	1010 „
août	65 „	1146 „	février	61 „	822 „
septembre	64 „	1089 „	mars	61 „	1035 „
octobre	64 „	1087 „	avril	61 „	971 „
			mai	61 „	507 „

On remarquera qu'à l'exception de mai 1954 où les oiseaux venaient de commencer à pondre et de mai 1955, saison de la mue, la ponte pendant les 12 mois a été sensiblement uniforme et abondante. La moyenne d'oeufs pondus par poule a été de 200 annuellement.

COLLEGE OF AGRICULTURE

ENTRANCE AND SCHOLARSHIP EXAMINATIONS, 1956.

Entrance and Scholarship Examinations for a limited number of entrants will be held at the Mauritius College of Agriculture, Reduit, from 9th to 13th April, 1956.

The examination will be competitive and compulsory and only holders of the Cambridge School Certificate with credit in English Language, Mathematics and 3 other subjects or equivalent certificate will be permitted to sit for the examination, unless the number of vacancies exceeds the number of candidates holding this qualification. In this event, candidates who do not possess this qualification or its equivalent will be admitted to the examination but will not be eligible for a scholarship.

Candidates will be examined in English, French, Mathematics, Chemistry (both practical and theoretical) and *either* Physics *or* Biology *or* Botany *or* Latin. The papers set will be about the Cambridge School Certificate standard. Candidates are required to bring their boxes of chemical apparatus with them for the examination in Practical Chemistry.

The course is opened to candidates of both sexes and applications should reach the Principal not later than 31st March, 1956.

For further information regarding fees, value of scholarship, supply of application forms, please apply to the Principal.

J. RENÉ LAGESSE
Principal

7th February, 1956.

COURSE IN TROPICAL AGRICULTURE, 1956.

Candidates who wish to be admitted to follow the One Year Course in Tropical Agriculture at the Mauritius College of Agriculture are informed that their applications should reach the Principal on or before 31st March, 1956.

The course which includes both theoretical and practical classes is specially designed to meet the needs of those who are working in the fields or who intend doing so, and will cover the various aspects of Tropical Agriculture with special reference to crops of economic importance to Mauritius, more particularly cane cultivation.

Fees are Rs. 25 monthly, payable in advance.

For further information please apply to the Principal.

Réduit

J. RENÉ LAGESSE
Principal

23rd January, 1956.

Meteorological Returns for Sugar Plantations

A. Rainfall in Inches (a) and Difference from Normal (b)

Period	West		North		East		South		Centre	
	a	b	a	b	a	b	a	b	a	b
November 1 — 15	0.07	—0.85	0.00	—0.92	0.94	—0.88	0.86	—1.17	1.37	—0.35
„ 16 — 30	1.55	+0.21	2.60	+1.36	1.92	—0.38	2.75	+0.32	1.72	—0.57
December 1 — 15	1.57	—0.65	2.32	+0.38	9.77	+6.51	6.49	+3.37	5.46	+2.12
„ 16 — 31	0.33	—2.92	2.69	—0.20	1.83	—2.91	1.55	—2.90	2.21	—2.87

B. Temperature — Mean (a), Difference from Normal (b)

Period	Pamplemousses				Plaisance				Vacoas			
	Max. °C		Min. °C		Max. °C		Min. °C		Max. °C		Min. °C	
	a	b	a	b	a	b	a	b	a	b	a	b
Nov. 1 — 15	30.4	+0.8	18.6	+0.6	27.4	—0.2	18.6	—0.3	25.7	+0.9	16.6	—0.7
„ 16 — 30	30.5	+0.2	19.4	+0.4	28.2	—0.4	19.9	+0.5	25.9	+0.2	18.4	+0.3
Dec. 1 — 15	28.9	—2.1	21.0	+1.0	27.2	—2.1	21.0	+0.5	24.6	—2.0	19.4	+0.5
„ 16 — 31	30.7	—0.4	20.5	—0.5	29.0	—0.8	20.7	—0.9	26.8	0.0	19.4	—0.3

C. Temperature — Difference from Normal of Temperatures Averaged over the Whole Island.

Period	Max. °C	Min. °C
November 1 — 15 ...	+0.5	—0.1
„ 16 — 30 ...	0.0	+0.4
December 1 — 15 ...	—2.1	+0.7
„ 16 — 31 ...	—0.4	—0.6

D. Wind Speed in Knots.*

Period	Pamplemousses		Plaisance		Vacoas	
	Mean of highest hourly velocity of each day	Absolute highest hourly velocity	Mean of highest hourly velocity of each day	Absolute highest hourly velocity	Mean of highest hourly velocity of each day	Absolute highest hourly velocity
November 1 — 15 ...	5	9	9	15	7	11
„ 16 — 30 ...	6	11	10	14	9	16
December 1 — 15 ...	8	14	12	15	13	17
„ 16 — 31 ...	4	7	10	14	9	15

* To convert into miles per hour multiply by 1.151.

(A)

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(B)

(C)

(D)

(E)

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(A) *Below :* Cleaning Evaporator Tubes with a Twin Drive Machine at a Sugar Refinery.

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(B) *Below :* Removing Scale from Babcock & Wilcox Boilers in an Indian Refinery.

(C) *Below :* Cleaning the tubes of horizontal Juice Heating Plant in an Indian Sugar Factory.

(D) 'Skatoskalo' Electric, Petrol-Driven and Pneumatic Machines, rotary Scaling tools, wire brushes etc., are designed to do routine cleaning and descaling work quickly, positively and thoroughly.

(E) *Left :* Operating two machines simultaneously of the cleaning of an evaporator.

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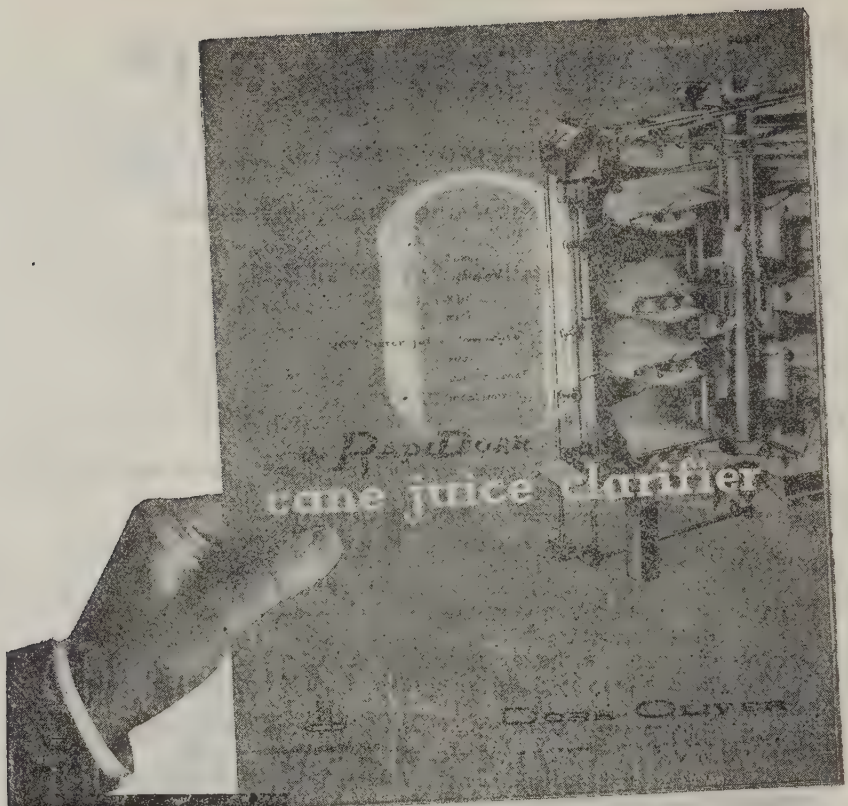

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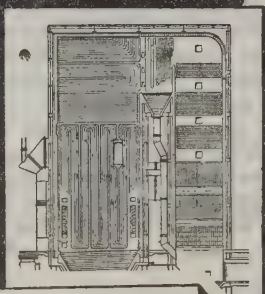
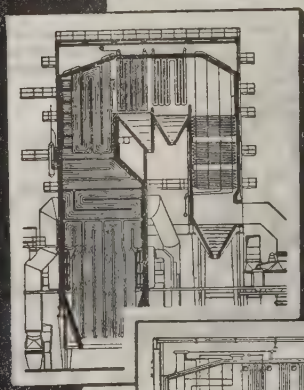


100 t/h 500° C

160 atü

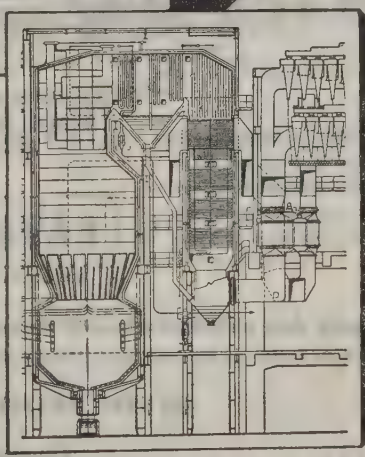
mit Strahlungs-Zwischen-Überhitzer



128 atü 530° C

300 t/h

1954



200 t/h 176 atü

610° C

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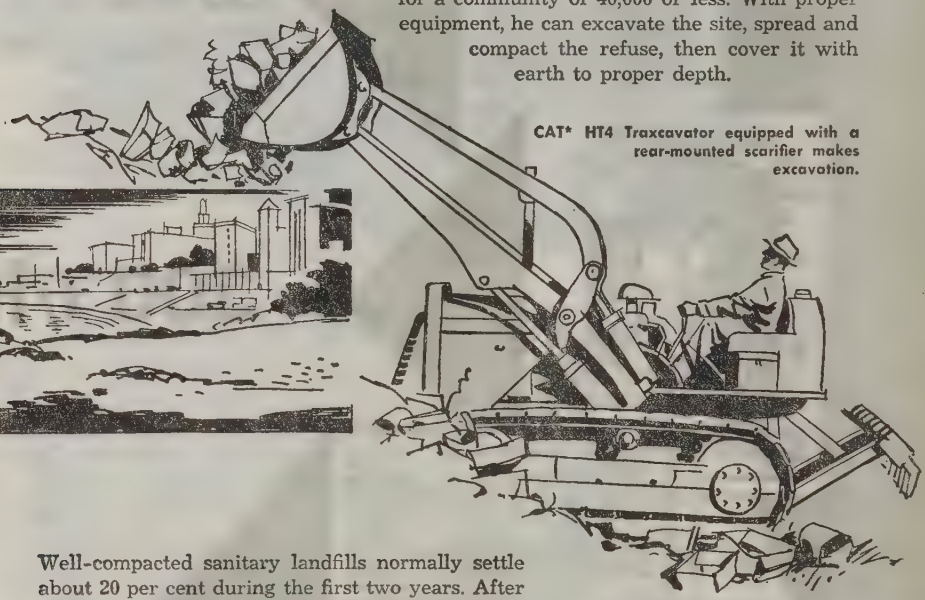

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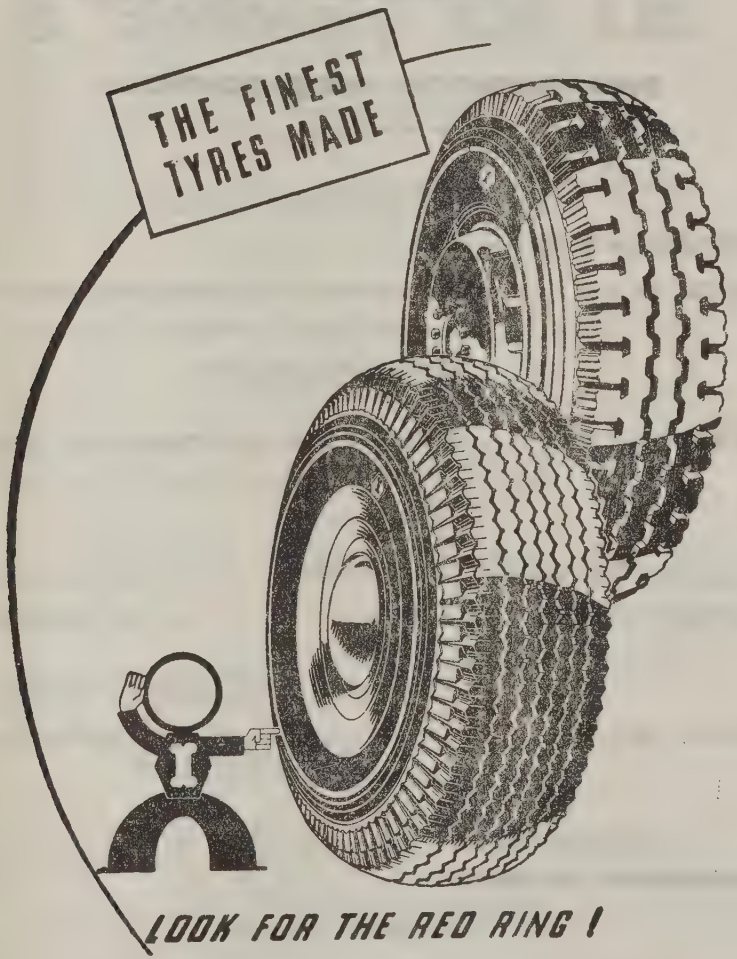

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Auditeurs

MM. CLÉMENT BOYER DE LA GIRODAY
PIERRE LARCHER

MM. HAREL, MALLAC & Cie
Administrateurs

THE MAURITIUS FIRE INSURANCE Cy. Ltd.

Fondée en 1855

10, Intendance Street, Port-Louis
Téléphone Port Louis No. 606

CAPITAL ... ... Rs. 1,000,000.00
RÉSERVES 1,203,734.76

Board des Directeurs :

MM. Maurice Doger de Spéville—*Président*
J. Léon Daruty de Grandpré *Vice-Président*
Ernest Rougier Lagane
Philippe Espitalier Noël
Pierre de Sornay
MM. Louis J. Hein
Richard de Chazal
Louis Larcher
Adrien P. Dalais

Administrateur :— RENÉ ADAM.

Auditeurs : — MM. MICHEL BOUFFÉ et MAURICE E. NOEL.

La Compagnie assure contre l'incendie et contre les incendies causés par le feu du ciel explosion du gaz et de la vapeur et aussi contre les risques d'incendie de voisin — à des primes variant suivant la nature du risque

L'assurance du risque locatif est de 1/4 de la prime lorsque l'immeuble est assuré par la Cie. et la prime entière lorsque l'immeuble n'est pas assuré par la Compagnie

Des polices d'assurances seront délivrées pour une période de cinq ans à la condition que l'assuré paie comptant la prime pour quatre ans. Une remise proportionnelle sera faite sur la prime des assurances pour trois ou quatre ans.

STELLA CLAVISQUE MARIS INDICI